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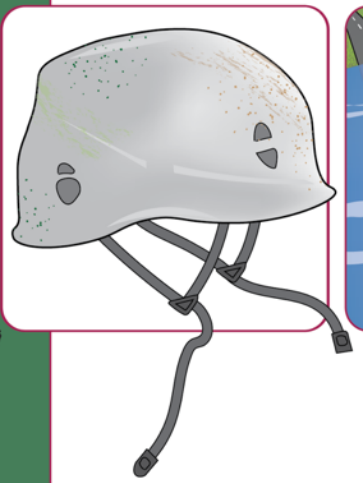

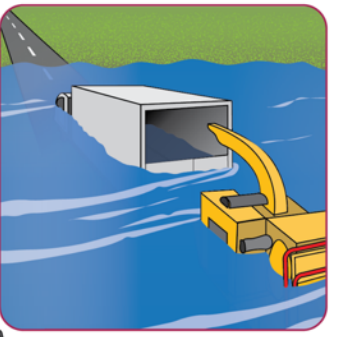

SAFE TREE WORK

INDUSTRY GUIDANCE ON SAFE WORK PRACTICES AND PERSONAL PROTECTIVE EQUIPMENT FOR ARBORICULTURAL WORK

MIS300

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Arboriculture Australia™ is a not-for-profit institution and is the peak national organisation promoting and representing tree workers, arborists, professional tree management, utility vegetation management and urban forestry throughout Australia and the Asia Pacific region.

Arboriculture Australia™ is proud to be the publisher of the Minimum Industry Standards series. Printed in Australia.

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The Arboriculture Australia™ Minimum Industry Standard series is dedicated to all our fellow workers who have lost their lives or have been permanently injured working in the arboriculture and vegetation management industries across Australia.

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A Minimum Industry Standard for Safe Tree Work

This book is one in a series of Minimum Industry Standards produced by Arboriculture Australia Ltd and the New Zealand Arboricultural Association in consultation with the national arboriculture community in both countries. These industry peer-reviewed documents provide a 'body of knowledge' which is shared by practitioners and can be used as the basis for training, dissemination of skills and professional development.

This document covers the core work skills of operating safely on tree work sites. The document is aimed at workers conducting tree pruning and removal operations, rather than consultancy, testing or other types of arboricultural works.

Industry partners

The Minimum Industry Standard series was produced by Arboriculture Australia Ltd and the New Zealand Arboricultural Association in partnership with the following state and national industry bodies.

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Contents

A Minimum Industry Standard for Safe Tree Work i

Industry partners i

1: Working in arboriculture..... 1

Introduction..... 1

Fundamentals of safe work in arboriculture 2

Safe work framework 3

Risk management 7

Risk management process 8
Sample risk matrix 9
Risk control measures 11
Example risk control measures 12
Competency for the task 13
Safety responsibilities at work 14

Fit for work..... 16

Diet 17

2: Preparing to conduct tree work 18

Receiving work instructions..... 18

Permits and notifications 21
Selecting and preparing equipment and PPE: 22

Personal Protective Equipment (PPE) for Arboriculture..... 23

PPE Frequently Asked Questions 23
A minimum standard for PPE 29
Helmet 30
Eye protection 31
Hearing protection 32
Safety boots 33
Chainsaw protective clothing 36
High visibility clothing 39
Sun protection 41
Gloves 43

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THIS DOCUMENT IS VALID UNTIL:
30/06/2023

Arc flash protection 44
Other PPE 46

Working in remote areas 47

3: Arriving on site 51

Approval to be on site 51
Deciding on a work plan 52

Site and tree risk assessment 56

Safe Work Method Statements and risk controls 58
Recording site and tree inspection 61
Completing the JSA or similar 62

Site hazards 67

Uneven or disturbed ground 67
Insects or wildlife 67
Hangers 68
Allergenic plants or vines 68
Electrical conductors and other services 69
Weather conditions 73

Tree hazards 75

Environmental impact and control measures 76

Environmental management plan 76
Waste/clean-up management plan 77
Water quality protection 78
Noise control 78
Dust/debris management 78

Site setup and preparations for work 79

Preparing the site 79
Work site exclusion zones 80
Signs 81
Traffic management 81
Emergency preparations 82
Aerial rescue 83
Pre-start checks 84

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THIS DOCUMENT IS VALID UNTIL:
30/06/2023

4: Conducting tree work 86

Safe work practices: accident prevention methods 86

Examples of safe work practices 87
Basic site safety rules 92
Work methods 93
Manual handling 93
Heat stress and dehydration 94
Fatigue and stress 96
Stress management 101

Communication during tree work 103

Call-and-response protocol 105
Methods of communication on tree sites 106
Hand and whistle signals for use on tree sites 111
Site management during tree work 113

5: Completing tree works 116

Processing debris 116
Cleaning, storing and transporting equipment 117
Retiring condemned equipment 117
Completion of works 119

Glossary 120

References 123

Minimum Industry Standards 124

Using the MIS in training and assessment 126

Disclaimer for Minimum Industry Standards and all associated documents 128

Industry stewardship program 129

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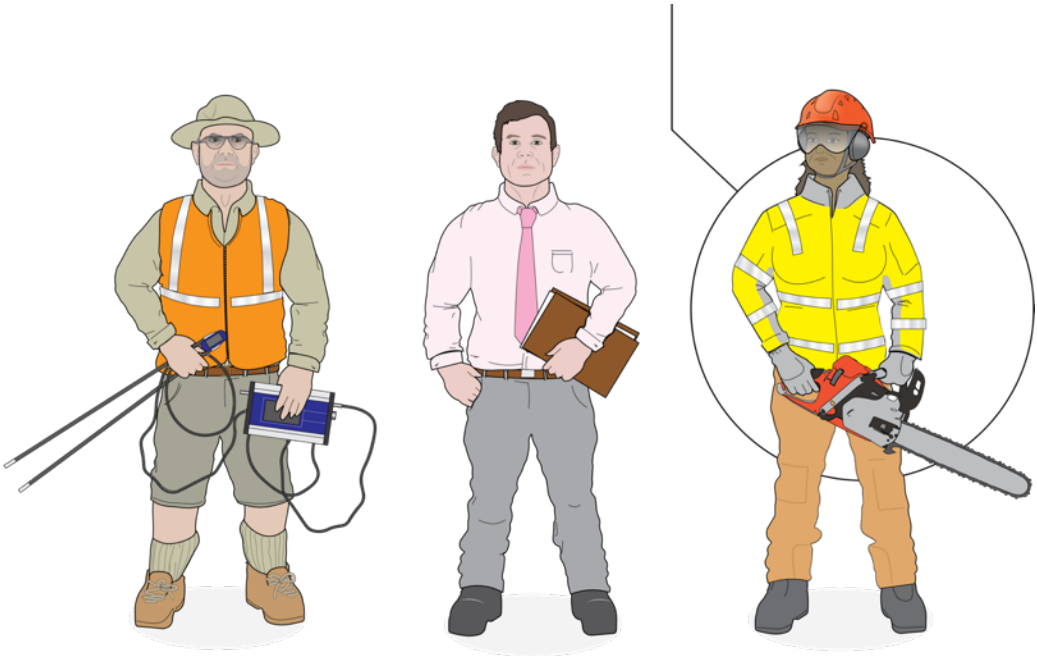
1: Working in arboriculture

Introduction

Arboriculture is defined as the practice and study of the care of trees and other woody plants in the landscape[4]. Arborists conduct testing and research, manage urban forests, provide expert witness and professional consultancy, and perform a wide range of practical tree care and tree removal operations.

This document focuses on the role of the practical arborist, conducting tree trimming or removal operations for private, municipal or utility clients.

This document describes safe work practices on tree trimming and removal sites



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Fundamentals of safe work in arboriculture

Arboriculture is a high-risk profession. The accident and injury rates in tree work are extremely high.

An American study found that tree workers were twenty-one times more likely to be killed while conducting tree work operations than while driving a vehicle.[5]

In Australia and New Zealand, the fatality rate in arboriculture is hard to determine, but according to Australian National Coronial Information Service data, there were at least forty-three fatalities in the tree care industry in Australia between 2003 and 2015.

This makes arboriculture one of the most dangerous professions in Australia and New Zealand. Working safely in arboriculture includes:

- Putting safety first
- Having a professional attitude, taking care and pride
- Actively prioritising safety, and stopping work when there are any concerns
- Careful and methodical forward planning and risk assessment
- Recognising the limitations imposed by crew size and ability, access to equipment, and experience and skill level
- Seeking high-quality training and mentorship
- Looking out for crewmates
- Using correct and well-maintained equipment
- Knowing when it is time to stop and find a safer way of doing something.

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Safe work framework

Work health and safety is governed by a hierarchy of regulations. Some of these are legal obligations, others are guidance material that helps businesses with meeting their obligations.

Different jurisdictions may endorse different regulations – always check with your local Work Health and Safety WHS regulator.

Acts

Australia

Work Health and Safety Act 2011

New Zealand

Health and Safety at Work Act 2015

Acts provide a legal framework to ensure the health and safety of workers and workplaces, and the health and safety of third parties under 'duty of care'.

The Safe Work Australia model *Work Health and Safety Act 2011* has been implemented in every state and territory except Victoria and Western Australia.

Victoria and Western Australia have WHS acts and regulations that apply in those jurisdictions.

In New Zealand, the *Health and Safety at Work Act 2015* applies to all employers, employees and contractors.

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Codes of Practice

Including:

Australia

How to manage work health and safety risks 2015

Work health and safety consultation, cooperation and coordination 2015

Managing risks of plant in the workplace 2015

Hazardous manual tasks 2015

Managing the risk of falls at workplaces 2015

New Zealand

Safety and Health in Arboriculture Approved Code of Practice 2012

An approved Code of Practice is a legally admissible document that helps businesses interpret their duties under the WHS Act.

Codes of Practice will usually include more industry-specific information that will help to contextualise the overarching legal requirements of the Act.

The Codes of Practice shown on the left are just some of the many Codes of Practice that may apply to different arboricultural work tasks.

Guidance material

Including:

Australia

Guide to managing risks of tree trimming and removal work (2016)

Guidance material such as the '*Guide to managing risks of tree trimming and removal work*' differs from the authoritative advice of a code of practice by allowing more discretion to choose options that better fit particular circumstances.

Guidance material contributes to the overall state of knowledge regarding hazards, risks and controls and may be tendered as evidence in court proceedings.

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Australian and New Zealand and International Standards

Including:

AS/NZS 1891 Industrial fall arrest systems and devices

AS 2727 Chainsaws - Guide to Safe Working Practices

Standards are voluntary documents that set out specifications, procedures and guidelines that aim to ensure products, services, and systems are safe, consistent, and reliable.

On their own, standards are voluntary. There is no requirement for the public to comply with standards. However, state and commonwealth governments often refer to Australian Standards® (AS), New Zealand Standards (NZS) or joint Australian/New Zealand Standards (AS/NZS) in their legislation.

When this happens, these standards can become mandatory.

Minimum Industry Standards

Including:

MIS300 Safe Tree Work (this document)

MIS301 Arborist Knots

MIS302 Arborist Ropes

MIS303 Tree Dismantling

MIS305 Tree Climbing

MIS309 Equipment Inspection

MIS311 Stump Grinders

MIS315 Chainsaw Operation and Tree Felling

MIS316 Mobile Wood Chippers

Other applicable MIS

Minimum Industry Standards such as this document (as well as other industry standards and guidelines) can be used as additional reference material to research industry consensus on safe and current practices.

Information in this document and in other MIS has been validated by subject matter experts as well as national, state and territory arboricultural bodies. It can be used in a similar manner to an Australian Standard:

- As a voluntary document
- As a guide to industry consensus on the interpretation and use of other documents such as the WHS act or applicable codes or guidelines

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Manufacturer's guidelines

The manufacturer's guidelines or product manual are critical sources of information on the selection, preparation, use and maintenance of any piece of equipment.

Company SWMS or SOPs

The company Safe Work Method Statements or Standard Operating Procedures define the ways in which work tasks will be conducted.

Company SWMS or SOPs may also reference external documents, for example AS/NZS or International Standards, Guides, MIS or other documents.

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Risk management

The process of risk management describes the ways in which an organisation or work crew identifies potential risks and alters their work method or introduces risk control measures to eliminate or mitigate risks.

Persons Conducting a Business or Undertaking (PCBUs) have obligations to ensure that work is conducted safely, and that risks are identified and controlled.

According to AS/NZS 4801-2001 Occupational Health and Safety Management Systems:

> "The organisation shall establish, implement and maintain documented procedures for hazard identification, hazard/risk assessment and control of hazards/risks of activities, products and services over which an organisation has control or influence, including activities, products or services of contractors and suppliers.
>
> The organisation shall develop its methodology for hazard identification, hazard/risk assessment and control of hazards/risks, based on its operational experience and its commitment to eliminate workplace illness and injury. The methodology shall be kept up-to-date."
>
> *-AS/NZS 4801 4.4.6*

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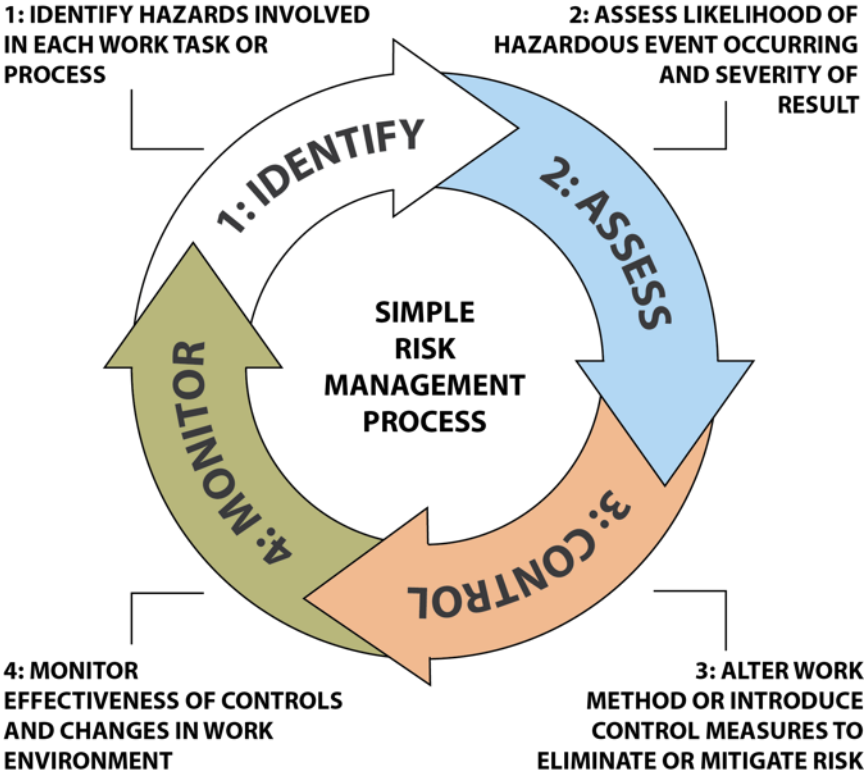
Risk management process

Different organisations will implement different risk management processes. The process described across the following pages is intended as an introductory guide only.

For each work task or activity, and for each new piece of equipment that will be used on site, the organisation must implement a risk management process to ensure that any risks are identified and controlled.


1: IDENTIFY HAZARDS INVOLVED IN EACH WORK TASK OR PROCESS
2: ASSESS LIKELIHOOD OF HAZARDOUS EVENT OCCURRING AND SEVERITY OF RESULT
1: IDENTIFY
2: ASSESS
SIMPLE RISK MANAGEMENT PROCESS
3: CONTROL
4: MONITOR
4: MONITOR EFFECTIVENESS OF CONTROLS AND CHANGES IN WORK ENVIRONMENT
3: ALTER WORK METHOD OR INTRODUCE CONTROL MEASURES TO ELIMINATE OR MITIGATE RISK

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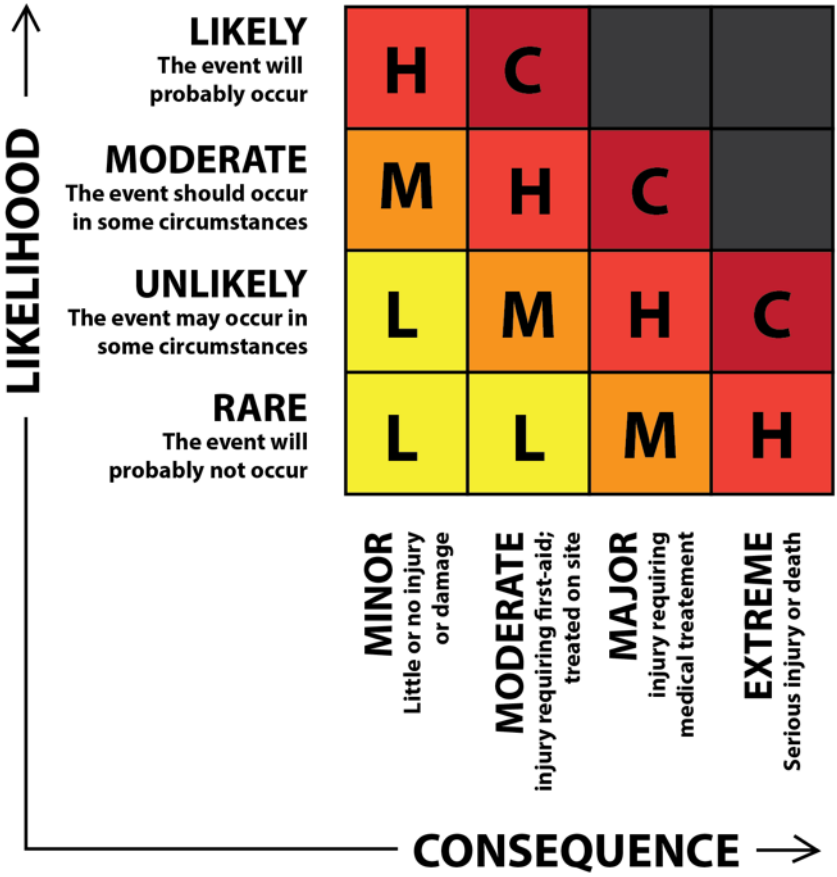
Sample risk matrix

A **risk matrix** like the sample below can be used to assess the risk posed by a particular hazard. The risk incorporates both the likelihood of an event occurring, and the probable consequences if the event was to occur.



Please see the risk matrix legend on the following page for a discussion of the risk codes used in the matrix.

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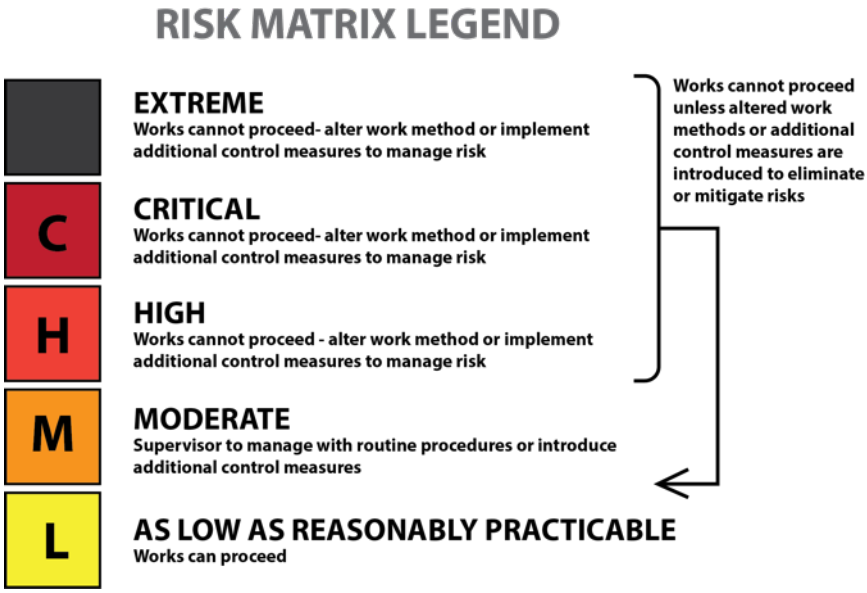
RISK MATRIX LEGEND
EXTREME
Works cannot proceed- alter work method or implement additional control measures to manage risk
C
CRITICAL
Works cannot proceed- alter work method or implement additional control measures to manage risk
H
HIGH
Works cannot proceed - alter work method or implement additional control measures to manage risk
M
MODERATE
Supervisor to manage with routine procedures or introduce additional control measures
L
AS LOW AS REASONABLY PRACTICABLE
Works can proceed
Works cannot proceed unless altered work methods or additional control measures are introduced to eliminate or mitigate risks

A risk matrix like the one shown on the previous page can be used as part of a risk management process.

Each work task in arboriculture (from reversing the truck up a driveway to rigging out the head of a decayed tree) can be assessed using this risk management process. For each task, the likelihood of an accident occurring, and the likely consequences of that accident, can be estimated and a **risk rating** can be generated using the matrix.

Where a risk rating higher than moderate is identified, works cannot proceed unless altered work methods or additional control measures are introduced to eliminate risks, or the risk rating is reduced to moderate or below.

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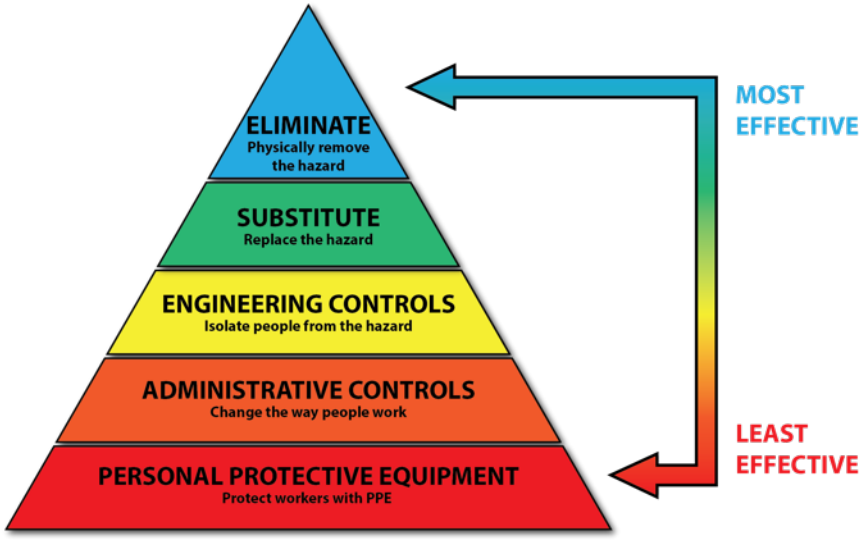
Risk control measures

Risk control measures are processes, equipment or work alterations that eliminate or mitigate the risk of harm.

A **hierarchy of risk control measures** has been identified and adopted within Australia and New Zealand. Where practicable, risk control measures higher up the pyramid should be adopted.



HIERARCHY OF CONTROL MEASURES

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Example risk control measures

The example below is provided to demonstrate the use of control measures to reduce the risk posed by chainsaw use. This list of examples does not include every risk or every possible control measure.

<table>
<tr><th colspan="3">Chainsaw use:</th></tr>
<tr>
<td> </td>
<td>Risks include:
• Cuts to self
• Cuts to other people
• Hearing damage
• Eye damage
• Muscular injuries
• Impact with cut pieces</td>
<td>Risk rating:
Moderate likelihood of Major injury requiring medical treatment
Risk rating =
C CRITICAL</td>
</tr>
<tr>
<td> </td>
<td>Control measures: follow the hierarchy of controls
1: Hazard cannot be eliminated
2: Hazard cannot be substituted
3: Engineering controls:
• Modern chainsaw with all safety features
4: Administrative controls:
• Exclusion zones
• Properly trained worker who is competent for her work task
• Correct saw use practices – used with both hands on saw
5: Personal Protective Equipment:
• Correct PPE supplied and worn at all times when operating chainsaw.</td>
<td>Residual risk rating:
Rare likelihood of Major injury requiring medical treatment
Residual risk rating =
M MODERATE
Chainsaw works may be conducted only when all identified controls are in place</td>
</tr>
</table>

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Competency for the task

Competency is the consistent ability to perform particular tasks and duties to the standard of performance expected in the workplace.

According to the Australian '*Guide to managing risks of tree trimming and removal work* (2016)':

> *"Most tasks carried out in tree trimming and removal work are covered by National Units of Competency (UoC) developed by the arboriculture industry.*
>
> *[…]*
>
> *Training for these national units of competency is available from registered training organisations throughout Australia."*

According to the New Zealand "*Approved Code of Practice: Safety and Health in Arboriculture* (2012):

> *All arborists engaged in arboricultural work shall be suitably qualified to carry out that work. Competency outcomes shall be documented, including any national qualifications supporting competency to this code.*

Competency is represented by a qualification and is gained by training and experience. To remain competent, workers must continue to practice or their skills will deteriorate.

The level of competence assessed in the relevant qualifications is not sufficient for many tree work tasks, and additional experience may be required to conduct specialist tree climbing, rigging or rescue operations or to work on more challenging trees.

It is the consensus position of industry that tree workers should hold the appropriate nationally-endorsed qualifications for their work tasks, or be supervised by someone who holds the applicable qualifications. Tenure in industry alone is not sufficient evidence of competency.

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Safety responsibilities at work

Every person operating in the workplace has WHS responsibilities and duties of care.

Guidance on the specific WHS responsibilities of each work role should be contained in the position description or employment contract. This may refer back to responsibilities described in additional documents such as the company WHS policy or similar. In general, more senior staff take on more responsibility.

Regardless of their position in the company, all workers must:

- Take reasonable care for their own health and safety
- Take reasonable care for the health and safety of others who may be affected by their acts or omissions
- Cooperate with anything the employer does to comply with OHS requirements
- Not 'intentionally or recklessly interfere with or misuse' anything provided at the workplace for OHS.

Tree work is a high-risk activity. Developing a professional attitude and actively contributing to a company's safety ethos is part of the work role of any arborist and is also a duty under the law. Worker responsibilities include:

- Putting safety first. Actively prioritising safety, looking out for each other, and stopping work when there are any concerns.
- Speaking up. If workers are unsure about their responsibilities, about their own competency for a task, or about a process or piece of equipment, it is important to bring this up and seek assistance rather than 'having a go at it'.
- Reading and following company safety procedures and other policies.

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Employer responsibilities	Employee responsibilities
Provide and maintain safe plant (machinery and equipment).	Take reasonable care for your health and safety in the workplace. You must also take reasonable care for the health and safety of others who may be affected by what you do or don't do.
Provide and maintain safe systems of work - for example, controlling entry to high-risk areas and providing systems to prevent falls from heights.	Cooperate with your employer about any action they take to comply with the OHS Act or Regulations. For example, use equipment properly, follow safe work policies and procedures and attend training.
Ensure the safe use, handling, storage or transport of plant or substances.	Don't intentionally or recklessly interfere with or misuse anything at the workplace to support health, safety and welfare.
Keep workplaces that you manage and control in a safe condition, free of risks to health (for example, ensure fire exits aren't blocked, and the worksite is generally tidy).	
Provide suitable facilities for welfare at any workplace you manage and control.	
Give your employees the necessary information, instruction, training or supervision to enable them to do their work in a way that is safe and without risks to health.	

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Occupational health and safety – your legal duties

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Fit for work

Arboriculture is a high-risk industry. Arriving on site tired, hungover, dehydrated or otherwise not fit-for-work can be dangerous for both the worker and their crew mates.

It is the responsibility of every worker to arrive on site 'fit for work'. Arriving fit for work includes:

- Getting enough sleep. Lack of sleep leads to loss of concentration, poor decision making and senseless mistakes.
- Being drug and alcohol free. Hungover tree workers are dangerous and should not be on site. An increasing number of arboricultural organisations are implementing random drug and alcohol testing to ensure that employees are fit to perform high risk work.
- Declaring any prescription medication which might compromise a worker's ability to safely perform their work role.
- Being in good physical shape and fit for the task and environment. Unfit workers may struggle with the physical nature of arboriculture.
- Having a healthy diet.
- Being free of injury or physical incapacity. Coming in to work before injuries are properly healed is a good way to make them worse.
- Having a good mental attitude and a focus on the task at hand, and treating the work with respect. As professionals, workers owe a duty of care to themselves and to their workmates. Arriving on site tired, distracted, or feeling the effects of alcohol or drugs (even from the night before) is putting their life and the lives of their workmates at risk.

Employers have a duty to provide a safe workplace, and may consider pre-employment medicals, drug and alcohol testing, audio testing and requiring the disclosure of existing injuries to ensure that employees are suitable for high-risk work.

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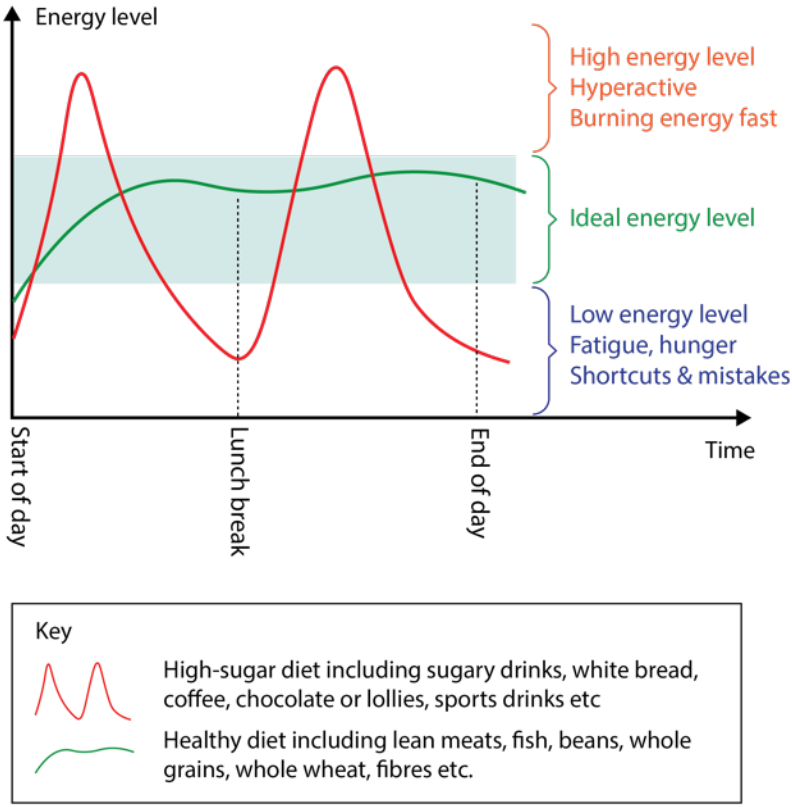
Diet

For every practical arboricultural worker, the two most important tools are the body and the mind. Making good decisions and being fit enough to carry them out are at the foundation of safe and efficient tree work.

Diet plays a critical part in the function of both brain and body. When workers consume considerable amounts of caffeine, sugary drinks and other high-sugar foods, they will experience high-energy periods followed by low-energy 'crashes' when blood sugar levels are low.

Both high and low energy levels will have a negative impact on decision making and work safety.



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2: Preparing to conduct tree work

Receiving work instructions

Before setting off for any job site, it is important to be clear about the work that will be done, and how it will be done.

This will help to make sure that the correct tools and equipment are taken, that workers are prepared for the work they will do and that they allow enough time to complete the prescribed works.

In many organisations, work instructions are given in the form of **specifications** or a **scope of works**.

These can be provided as paper documents, on tablets or via other electronic means. Regardless of how they are provided, it is critical for workers to receive all the required information.

Workers should ensure they take the time to read the scope of works carefully and ask any questions that are required to clarify the requirements of the job.

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Scope of works or work specifications

The scope of works or work specification needs to provide all the information that the crew requires to conduct the work. Different organisations use different formats, but all of the following information should be included:

Details of which trees are to have works completed

- These should be clearly identified, preferably including a site map if there are multiple trees on site. There may be multiple sites or many trees in a geographic area. If there is any doubt, seek clarification.

Description of the work to be done

- Trees should be clearly identified, preferably including a site map if there are multiple trees on site. If there is any doubt, seek clarification.
- Where trees are to be pruned, pruning specifications must include enough detail to guide the workers in pruning the correct tree part(s).

Advice as to how debris will be handled

- Will branches be mulched?
- Will mulch be left on site or removed? If left on site, where should it be tipped or sprayed?
- Will timber be removed or left on site? If left on site, where should it be left? Does it need to be cut to particular lengths? Should it be split or stacked?

The stump height (for removals)

- In most cases, trees will be removed to ground level, but if the stumps are to be removed with an excavator or similar at a later date, then a metre (or more) of stump should be left to give leverage.

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Details of any stumps to be ground out (for removals)

Level of care to be taken with garden and surrounds

- This is a very important point to confirm, particularly when quoting work. Being able to drop sections into a garden (or not) can make hours of difference to even a small tree removal. If possible, explain this to clients when quoting work and confirm where gardens must be protected.

Suitable time(s) and date(s) for tree work to be conducted

- Tree work is noisy, and tree work sites and machinery will usually prevent access. Some sites (for example schools) may only allow access on specific dates or times.

  Some sites may specify restrictions on the use of noisy machinery, for example a zoo may require the use of electric or hand saws.

Any other notes:

- How long is the job quoted to take?
- Any underground services or septic tanks?
- Any specific requirements for specialised tools or equipment?
- Any known habitat or environmental considerations?
- Any considerations of access, gates, pets etc.?
- Any restriction on machinery – for example airports may have a height limit on plant which can be used.
- Many councils and municipalities have regulations or bylaws that apply to the removal or pruning of trees on private land.

If possible, **discuss the scope of works with the client** when you arrive on site; confirm that all elements are understood and that you know exactly the work to be done.

Take time to go through the scope of works with all crew members on site and confirm that the specified works are clear and understood.

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Permits and notifications

Tree protection and preservation regulations vary between different jurisdictions.

In some areas, there are specific tree protection measures that apply to the pruning or removal of trees on private land.

If tree protection bylaws or other regulations apply, an application may be required for a tree work or tree removal permit prior to works commencing. It may be the responsibility of the crew leader, business owner or the tree owner to apply for this permit.

In addition, trees may be listed on the National Heritage Trust register, or other significant tree registers.

Traffic control and road closure permits

Some tree work near public roads will require traffic control or road closure permits. There may be fees associated with these permits. Ensure that any permits are obtained before scheduling the work.

Anyone working on public roads installing traffic control must have the relevant certificate for their state or territory. An authorised traffic management plan must be approved by the asset holder or client.

Notifying other parties

Consider whether works will have an impact on neighbours or local residents. If trees overhang a neighbouring property, neighbours must be notified to remain outside the exclusion zone.

Consider whether you will require permission to access adjacent properties, or to park machinery such as EWPs, cranes, chippers etc. to reduce impact on any other parties.

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Selecting and preparing equipment and PPE:

Before setting off, use the scope of works to select and prepare the equipment that will be needed for the job.

The selection and use of specialist arboricultural equipment such as woodchippers, stump grinders, chainsaws and arborist height safety equipment is discussed in the following Minimum Industry Standards:

- **MIS302 Arborist Ropes**
- **MIS303 Tree Dismantling**
- **MIS305 Tree Climbing**
- **MIS307 Crane Use for Tree Work**
- **MIS308 Tree Pruning**
- **MIS309 Equipment Inspection**
- **MIS311 Stump Grinders**
- **MIS315 Chainsaw Operation and Tree Felling**
- **MIS316 Mobile Wood Chippers**

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Personal Protective Equipment (PPE) for Arboriculture

Personal Protective Equipment (PPE) includes clothing or other articles such as helmets that may help to protect the wearer in the event of an accident. Generally speaking, PPE is the least effective method of preventing injury, but may be effective when used in conjunction with other methods.

PPE Frequently Asked Questions

What PPE is required on an arboricultural site?

It will depend on the tasks being conducted, but for most arboricultural sites where chainsaws are being used on the ground, PPE would include:

- Helmet
- Hearing protection (Class IV or V protection minimum)
- Eye protection
- High visibility clothing
- Safety boots
- Sun protection including a long-sleeved shirt
- Chainsaw-protective trousers (if using a chainsaw)
- Gloves (if using a chainsaw or rigging)

Note that additional PPE may be required for some work tasks, or by some organisations.

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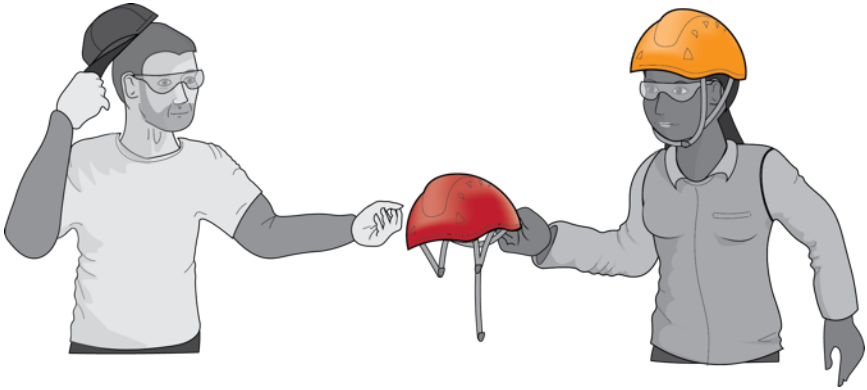
Who decides the PPE that is needed?



In some cases, PPE will be required for a particular work task by regulations that apply to anyone conducting that type of work. In other cases, PPE will be part of the risk management strategy determined by a duty holder, or required by the product manual for a piece of equipment that is being used.

In any case, wearing appropriate PPE while conducting a work task will be a documented requirement for conducting that work.

According to Safe Work Australia[3]:

> *"A Person Conducting a Business or Undertaking (PCBU) must:*
>
> - *Consult with their workers when selecting PPE*
> - *Ensure, as far as is reasonably practicable, that the PPE is used or worn by the worker."*

According to the New Zealand Approved CoP for Safety And Health In Arboriculture:

> *Where the hazard has not been eliminated or isolated, employers shall take steps to minimise the exposure or likelihood of exposure to the hazard and where appropriate:*
>
> - *provide protective clothing and equipment and ensure that it is accessible and used*

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Should PPE be provided?

Yes. Providing suitable PPE for each work task, as well as training and maintenance for the PPE, is a legal responsibility for a PCBU.

In Australia, the legal requirements of businesses in relation to PPE are set out in Regulations 36, 44 and 45 of the model WHS Regulations.

In New Zealand, the legal the legal requirements of businesses in relation to PPE are set out in Sections 27 and 211 of the Health and Safety at Work Act and in the Approved CoP Section 2.2.2.

Businesses may opt to provide a PPE allowance, providing it covers the cost of the PPE required under WHS laws. The business would still have a responsibility to ensure that the PPE purchased was suitable for the work task. Businesses may not require staff to provide their own PPE.

Businesses also have to ensure that staff are suitably trained in the use and care of PPE. According to Safe Work Australia[3]:

> *"A Person Conducting a Business or Undertaking (PCBU) must:*
>
> - *Provide the worker with information, training and instruction in the proper use and wearing of PPE and its storage and maintenance."*

According to the New Zealand Approved CoP for Safety And Health In Arboriculture:

> *Workers should also be trained and competent in the following areas as they apply to their work:*
>
> > *use, inspection and maintenance and storage of personal protective equipment*

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Do I have to wear the PPE that has been provided?

Yes. According to Safe Work Australia[3]:

"A worker who is provided with PPE by their business must:

- *Use or wear the PPE in accordance with any information, training or reasonable instruction provided by the PCBU, so far as they are reasonably able.*
- *Not intentionally misuse or damage the PPE.*
- *Inform the business of any damage, defect or need to clean or decontaminate any of the PPE if they become aware of it.*

If the PPE is uncomfortable, does not fit properly or the worker has an adverse reaction to using it, they should consult their manager.

If a worker refuses to wear or use the PPE, the business can take action against the worker. A worker who does not wear or use PPE, or intentionally misuses or damages it, may face disciplinary action or even prosecution."

PPE is no use if you're not wearing it

Hearing protection not worn

Eye protection not worn

Chinstrap not done up correctly

Ensure that PPE is worn correctly whenever required for a work task

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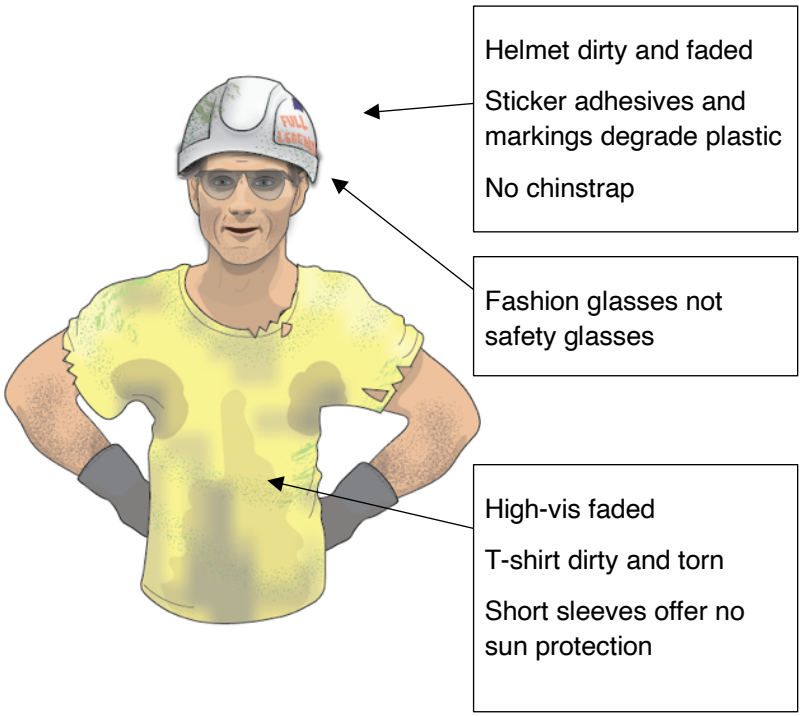
How should I take care of PPE?

PPE should be kept clean, undamaged and fit for use. Damaged or non-functioning PPE should be reported to a supervisor and replaced.

The PCBU has a responsibility to ensure that the care and maintenance of PPE is understood by workers. Use the manufacturer's instructions to determine correct care and maintenance.

Do not modify or mark your PPE. Many helmets are degraded by the adhesives used in stickers.

Leaving dirt or chemical stains on PPE will increase the speed of degradation and may compromise the function of the PPE.


Helmet dirty and faded
Sticker adhesives and markings degrade plastic
No chinstrap
Fashion glasses not safety glasses
High-vis faded
T-shirt dirty and torn
Short sleeves offer no sun protection

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Do I need to select PPE that is certified to an AS or NZS standard?

Where possible, PPE that is certified to an Australian or New Zealand or equivalent standard should be selected:

> *"Persons Conducting a Business or Undertaking must also ensure the PPE complies with the relevant Australian Standard or equivalent standard."*
>
> *- Safe Work Australia, PPE guidance*

> *"Personal protective equipment (PPE) is fit for purpose and, where appropriate, in accordance with the relevant Australian Standard."*
>
> *- Safe Work Australia, Guide to managing risks in tree trimming*

In some cases (for example Arborist climbing helmets with incorporated hearing and eye protection), the PPE may be certified to international standards but not to Australian standards. Please see following page.

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A minimum standard for PPE

This document attempts to provide a minimum standard for PPE use as determined by industry consensus and the requirements of regulations and standards.

Many businesses (and some jurisdictions) may require workers to wear additional PPE, either for particular work tasks or throughout their working day. For example, some companies require some or all of the following articles of PPE:

- Chainsaw resistant boots
- Additional chainsaw protective clothing (EG, gloves, arm protection, chainsaw protective jackets or gaiters)
- Additional visibility (EG, reflective stripes or similar)
- Arc protection for working near energised conductors.

Workers must always wear the PPE provided for their designated work tasks. Any concerns must be addressed in discussion with supervisors or duty holders, and the SWMS must be adjusted before PPE can be removed.

Some conditions or work sites may require alterations to the PPE list specified in this guide. In some circumstances the use of PPE may introduce additional risk, for example the use of flammable clothing when working in the vicinity of potential arc flash. In these circumstances an organisation should determine and record the alteration in their SWMS.

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Helmet

Wearing a helmet is required on every site where aerial work or chainsaw operation is taking place, and while using most arborist tools and machinery.

Arborists should select helmets that are designed and rated for industrial use and fitted with a chinstrap to prevent the helmet from being dislodged by foliage or branches, or during a trip or fall.

Arborist helmet	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZS 1800-1998 AS/NZS 1801-1997 Occupational protective helmets NZS 5806:1980 Specification for industrial safety helmets (medium protection)
EN European standard	EN397 EN12492 EN14052
ANSI US standard	ANSI Z89.1

Pre-use checks:

- Check for damaged or cracked plastics, inoperable buckles, degraded or cut webbing, chemical damage, UV degradation or any other non-functioning components.
- Check helmet manufacture and service date to confirm that it is within its manufacturer's recommended service life. AS/NZS 1800-1998 recommends that helmets are replaced no later than three years after their date of issue and that helmet harnesses are replaced no later than two years after their date of issue. Helmets made to international standards may have longer life spans.

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Eye protection

Eye protection is required for most practical arboricultural work tasks, and for the use of arboricultural power equipment.

Eye protection can be either the use of safety glasses or a face shield integrated into a helmet, as shown on the right.

Where a face shield is used, workers must ensure that it is placed in the protective position whenever the potential for eye injury exists. Usually this means whenever the worker is within a work zone – not just when cutting.

Eye protection	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZS 1336-2014 Recommended practices for occupational eye protection AS/NZS 1337-1992 Eye protectors for industrial applications
EN European standard	EN166 (frames) EN170, EN171, EN172 (UV, Infrared, solar protection)
ANSI US standard	ANSI Z87.1 Eye Protection

Pre-use checks:

- Check for damaged or cracked plastics, broken frame, damaged, opaque, heavily pitted or discoloured lenses, chemical damage, UV degradation or any other non-functioning components.
- Check manufacture and service date to confirm that it is within its manufacturer's recommended service life.

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Hearing protection

Hearing loss is a significant risk for tree workers. Many arboricultural tools and machines produce high levels of noise. Hearing loss is incremental and cumulative; organisations should consider pre-employment and ongoing hearing testing to monitor the efficiency of their hearing protection processes.

The model WHS regulations define the exposure standard for noise as being no higher than 85 decibels (dB) over an eight-hour shift, with no peak higher than 140 dB.

As chainsaws typically operate at noise levels of 110dB, and wood chippers typically operate between 110dB and 120dB (although peaks of 140dB may be reached when chipping deadwood) hearing protection is critical for arboricultural works. Many commonly-used ear protectors do not offer sufficient protection for chipper use.

Hearing protection	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZS 1270-2002 Acoustics – Hearing protectors Chainsaw operators should wear minimum Class 4 or Class 5 protection
EN European standard	EN 352 Sometimes SNR (Simplified Noise Reduction or Single Number Rating) will be used – this shows how many decibels (dB) the hearing protection provides.

Pre-use checks:

- Check for damaged linings or cracked frames, non-functioning components, heavily degraded or stiff protective elements.
- Check hearing protection manufacture and service date to confirm that it is within its manufacturer's recommended service life.
- Inspect hearing protection for signs of general wear and tear such as fraying, discoloration, stiffness, hardening or flaking.
- Check that hearing protection will seal well over the operator's ears or will fit correctly. This is of particular concern when inspecting helmet-mounted hearing protection.

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Safety boots

In Australia, AS. 2727-1997 Chainsaws specifies the use of safety boots with a protective toe certified to AS/NZS 2210-2010 whenever using a chainsaw. In New Zealand, the Approved CoP requires that *all workers engaged in arboricultural operations shall wear footwear which has safety toe caps complying with either AS/NZS 2210 Occupational protective footwear Part 1 or any other standard with the same or more stringent criteria. Footwear should also provide support to the ankles and be laced.*

In addition to these requirements, many chainsaw manufacturer instructions require the use of chainsaw resistant boots when using a chainsaw. Some climbers prefer to wear specialised climbing boots when climbing to perform pruning.

Safety boots	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZS 2210-2010 - Occupational Protective Footwear
EN European standard	EN ISO 20345:2011 Safety footwear EN ISO 17249: Chainsaw resistant boots (A boot complying to EN ISO 17249 automatically complies to EN ISO 20345) Class I: chain speed < 20m/s Class II: chain speed < 24m/s Class III: chain speed < 28m/s
ANSI US standard	Z41.1-1967 Safety footwear OSHA reg. 1910.266(d)(1)(v) (Chainsaw protective footwear for forestry operations)

The following pages present a comparison of the suitability of different footwear for particular work tasks. As with all PPE, the appropriate PPE must be worn when conducting the task. A climber who has finished light pruning duties whilst wearing climbing boots must change into suitable safety boots to help with clean-up, or whenever site requirements or work tasks stipulate the need for safety boots.

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Types of arboricultural footwear

A: Chainsaw resistant boot

Chainsaw resistant boots contain additional protection against contact with a running saw. Different classes of chainsaw protection exist.

Chainsaw resistant boots will usually be certified to EN ISO 17249 and will display the class of protection (see previous page).

B: Safety boot

Safety boots have a protective toe, usually steel but sometimes constructed of other materials.

Safety boots must be certified to AS/NZS 2210-2010, EN ISO 20345 or equivalent standards.

C: Climbing boot

Climbing boots or shoes may provide better grip when branch-walking. Climbing boots offer no chainsaw or impact protection.

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Guidelines for selection of footwear on arboricultural sites

Arboricultural work activity	Types of footwear: A: Chainsaw boot	B: Safety boot	C: Climbing boot
Formative pruning, light ground work with hand-tools, use of a pole-saw for light pruning.	🟢	🟢	🟡
Climbing; inspection or pruning	🟢	🟢	🟢
Climbing; rigging or dismantling, intermittent aerial use of chainsaws.	🟢	🟡	🟡
EWP use	🟢	🟢	🔴
General ground work on arboricultural sites; ground work on sites where aerial work or tree felling is taking place	🟢	🟢	🔴
Operation of plant	🟢	🟢	🔴
Ground work with chainsaws	🟢	🟡	🔴

Key:

🟢 Industry identifies no significant additional risks with this use.

🟡 This use may present additional risks. Use with caution. Many chainsaw operator manuals recommend the use of chainsaw-resistant boots when operating a chainsaw.

🔴 This presents significant risks. Use only when a documented risk assessment determines that risks can be controlled.

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Chainsaw protective clothing

Chainsaws are used on almost every tree work site. AS/NZS 2727-1997 requires the use of chainsaw trousers or chaps whenever using a chainsaw. Most professional saws require Class 3 protection (the speed of saw chain that will be stopped)

Chainsaw protective clothing	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZS 4453.3-1997 Chainsaw protective legwear
EN European standard	EN 381 EN 381-5: leg protectors EN 381-7: chainsaw protective gloves EN 381-9: chainsaw protective gaiters EN 381-11: upper part of the body Class I: chain speed < 20m/s Class II: chain speed < 24m/s Class III: chain speed < 28m/s

Pre-use checks:

- Check for cuts or tears in chainsaw protective materials, separation of the protective materials from their intended location and structural failure of the clothing.
- Check article manufacture and service date to confirm that it is within its manufacturer's recommended service life.
- Check that the clothing was suitable for its intended use in its new condition (certified to the correct standard and class, for example).
- Inspect the general condition of the protective clothing, including age, cleanliness, correct composition and any signs of material degradation such as fading or stiffness. If the clothing is no longer functioning correctly or offering sufficient protection, it is time to replace it.

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Leg protection

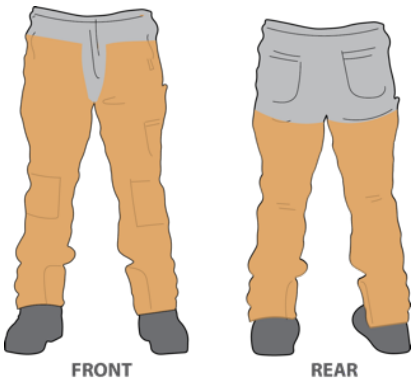
Chainsaw protective legwear is required whenever using a chainsaw in Australia and New Zealand. Chainsaw trousers or chaps should be certified to either AS/NZS 4453.3-1997 or EN 381-5.

Types of leg protection

The EN 381 standards recognise two main types of chainsaw leg protection.

Type A or B chainsaw trousers provide front protection. The only difference between the two types is that Type B wraps 5cm further around the inside of the left leg.

These trousers are designed for professional, competent users who are aware of the limited protection and use saws in a manner that controls this risk.



Type C chainsaw trousers provide protection to both the front and rear of the leg.

These trousers are intended to be used by people who normally don't work with chainsaws or in exceptional situations.

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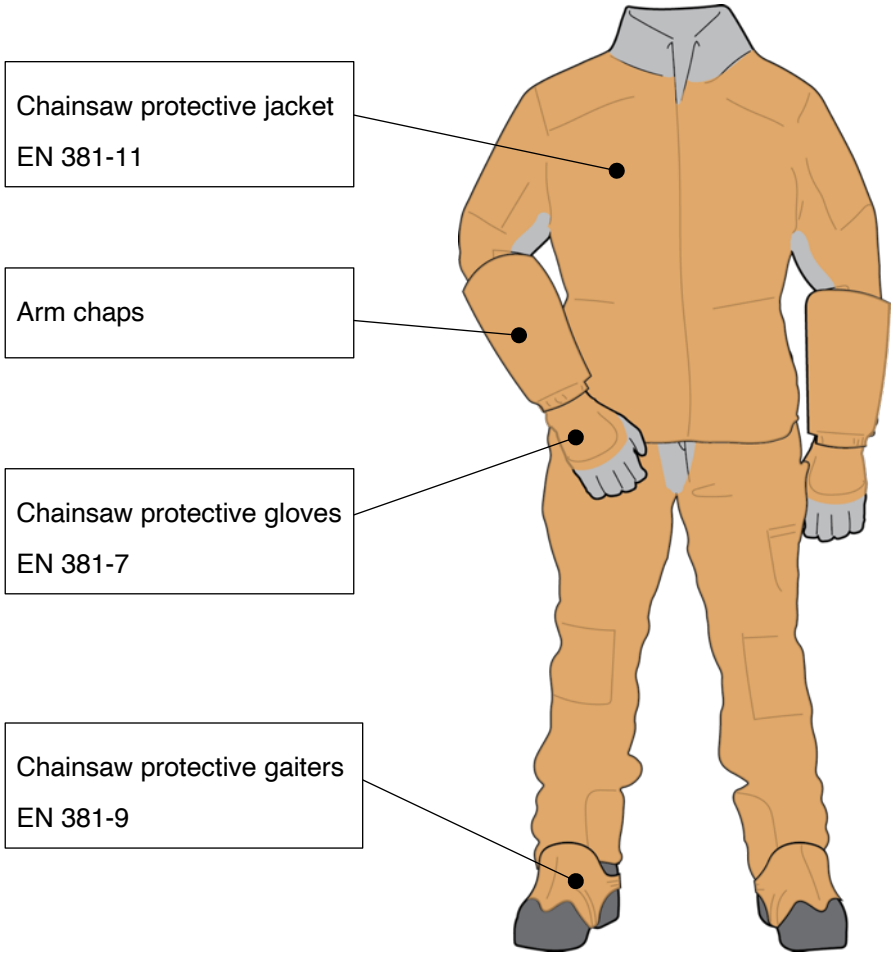
Other chainsaw protective clothing

A wide variety of other types of chainsaw protective clothing is available and is required in some countries and by some organisations. At the time of printing, AS/NZS standards and industry codes and guidelines for arboriculture do not require any of the articles of protective clothing below except for chainsaw trousers.

Use of chainsaw protective clothing makes the wearer more susceptible to heat stress. In hot conditions, wearing chainsaw protective clothing may decrease the evaporation of perspiration and impact the body's natural cooling mechanisms.



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High visibility clothing

High visibility clothing must be worn whenever struck-by risks exist, including when aerial work is being conducted, when felling work is being conducted, and when working near areas with vehicle or public traffic. Most arboricultural companies require high visibility clothing on all sites.

High visibility clothing	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZ 4602.1-2011 High visibility safety garments - Garments for high risk applications Class D: for use in daytime Class N: for use in day/dusk/night/dawn conditions Class NF: Non-fluorescent, solely for use in industries that require garments to be made from natural fibres AS/NZ 1906.4-2010 Retroreflective materials and devices for road traffic control purposes - High visibility materials for safety garments. NZ TTMC-W17 Revised Requirements for High Visibility Garments
EN European standard	EN ISO 20471 Class I: for use in full or partial sunlight; not for use on roads Class II: suitable for use on roads <50mph, some twilight work Class III: suitable for night work on roads

Note: AS/NZS standards apply solely at the date of issue; follow up checks are at the discretion of management. The EN standards require colour-fastness (that the colour has not faded) after a minimum of five washes.

AS/NZS standards require Class N (dusk or night high-visibility clothing) clothing to be worn when exposed to vehicular traffic at dusk or at night. The reflective strips may only be compliant for a specified number of washes.

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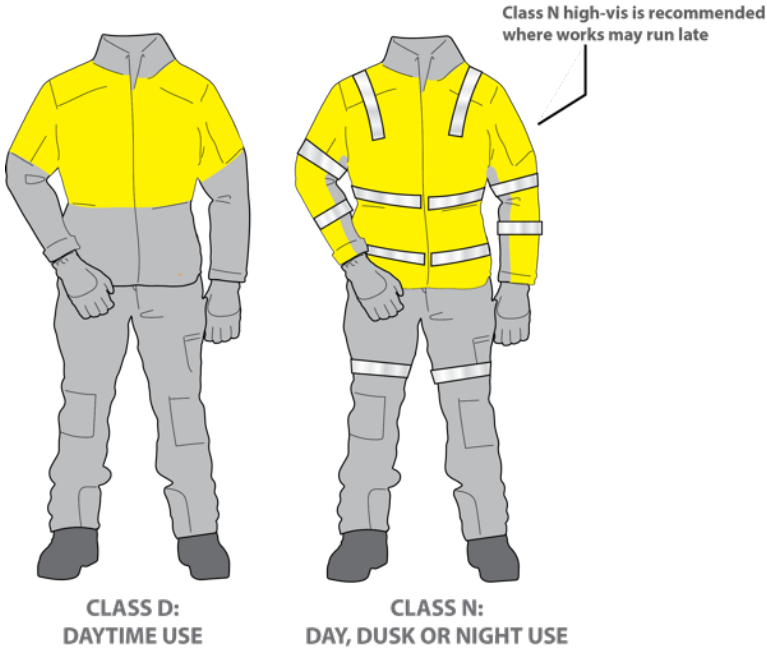
AS/NZ 4602.1-2011 contains the following recommendations regarding the selection and use of high visibility clothing:

1. Businesses should have procedures in place to ensure items are worn correctly and that workers understand why garments will be ineffective if not worn correctly and at the appropriate time.
2. Garments should be stored so that fading of fluorescent material and degradation of retroreflective material due to heat are limited.
3. Garments should be kept clean by washing/cleaning according to manufacturer's instructions, and
4. Garments should be inspected on a regular basis and replaced if badly damaged, soiled or faded. "In constant use, garments should be critically examined at 3-month to 6-month intervals."



Note: AS/NZ 1906.4: 2010 imposes additional requirements when conducting traffic management or working near roads

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Sun protection

According to the Australian Cancer Council, Australia and New Zealand experience the highest rates of skin cancer in the world: at least two in three Australians will be diagnosed with skin cancer before the age of seventy.

Arboricultural businesses have a duty to ensure that workers are suitably protected from exposure to ultraviolet radiation. Businesses can meet this requirement by some or all of the following:

- Avoiding exposure to the sun
- Providing protective clothing
- Providing sunscreen.

UV protection	Applicable standards
AS/NZS Australian & New Zealand standard	AS/NZ 4399- 2017 Sun protective clothing - Evaluation and classification (clothing) AS/NZS 2604-2014 Sunscreen products - Evaluation and classification (sunscreen) AS/NZS 1067-2003 Sunglasses and fashion spectacles (sunglasses) Note that AS/NZS 1067-2003 is required in addition to the eye protection described in AS/NZS 1337-1992.

Tree workers should also consider the duty of care they owe to themselves. Ignoring sun protection and working in t-shirts without sunscreen will result in skin damage and potentially, in skin cancer.

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Sun protective equipment and clothing

According to the Australian Cancer Council's sample sun protection policy for outdoor workers**:**

> Workers who work outdoors will be provided with the following personal protective equipment, which must be worn when working outdoors:
>
> - Long-sleeved shirt with a collar made from material with an ultraviolet protection factor (UPF) of 50+.
> - Trousers (or knee-length shorts) made from UPF50+ material.
> - A sun-protective hat that shades the face, head, ears and neck, is made from UPF50+ material, and is in a broad-brimmed, bucket or legionnaire style.
> - Attachable brims and neck flaps when wearing a hard hat.
> - Broad-spectrum, water-resistant sunscreen with a sun protection factor (SPF) of 30+ or higher, that is applied generously twenty minutes before going outdoors so that it can be absorbed and reapplied at a minimum of every two hours. Sunscreen should be stored in a cool place (below 30°C) to prevent deterioration and reduction in effectiveness. The expiry date on the bottle should also be checked and adhered to.
> - Sunglasses that are close fitting, have a wrap-around style and have an eye protection factor of 9 or 10, or meet Australian Standards (AS/NZS 1067-2003) or safety glasses (AS/NZS 1337.1-2010).
> - A lip balm containing SPF30+ or higher is also recommended.
>
> Australian Cancer Council,
> Sample Sun Protection Policy for outdoor workers

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Gloves

Some regulations (and some manufacturer instructions) recommend the use of gloves when operating a chainsaw. In some jurisdictions, the use of cut-protective gloves is mandatory. Gloves can also provide some protection from the effects of vibration when using chainsaws or other power tools.

Many climbers prefer not to wear gloves when climbing, as gloves can interfere with the operation of some devices or the fine control required for manipulating thinner ropes.

The use of gloves can present an additional risk when feeding a chipper, as gloves may become snagged on a branch or stub. Gloves with tight cuffs may be less likely to be snagged but will be impossible to remove if caught.

It is recommended that arborists working with chainsaws on the ground use gloves, except where additional risks are introduced by this use.

Climbing arborists conducting intermittent chainsaw use in trees, for example when pruning, or when conducting intermittent rigging operations, may opt not to use gloves if preferred. Where extensive chainsaw use is to be conducted, for example when blocking down, it is recommended that climbers wear gloves to protect from the vibration of the saw.

The use of gloves for other arboricultural work activities should be considered as required by the work task. Some businesses require cut-resistant gloves when using handsaws – these may help to reduce the risk of accidental cuts to the off hand.

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Arc flash protection

An arc flash occurs when electrical current flows through an air gap between two conductors or between conductors and a pathway to earth. The arc reaches extremely high temperatures and may cause flash burns to workers who are well clear of the conductors. In addition, there may be a pressure wave, flying debris and hearing damage. Arc burns cause more fatalities in the electrical industry than electrocution.

Arc flash can occur during arboricultural operations when conductors are accidentally brought closer together, for example during rigging, or by the use of non-insulated tools.

AS/NZS 4836-2011 Safe working on or near low-voltage electrical installations and equipment specifies that arc flash PPE must be used in certain situations. Standards for arc protection are based on the NFPA standards in the United States.

(PPE)	AS/NZS 4836:2011 specifications	Clarification
Eye protection	No metal, complying with AS/NZS1337 and selected in accordance with AS/NZS 1336.	Heat resistant, no metal
Face Shield	Certified to 10cam/cm^2	Tested to 10cal
Arc Flash suit and hood	Certified to 40cam/cm^2	Tested to 40cal
Insulating gloves	AS2225 or Equivalent, rated to appropriate voltage, air tested before use.	IEC, ASTM and EN gloves acceptable
Flame-resistant (FR) gloves	Gloves made from leather or other non-melting heat-resistance material	Complying with AS/NZS2161.4
Protective Clothing	Flame-resistant, full body clothing with no metal.	Cotton not suitable. Must be FR rated and tested fabric.

Based on Table 9.1 AS/NZS 4836:2011
Adapted by: Andre Borell, Extreme Safety

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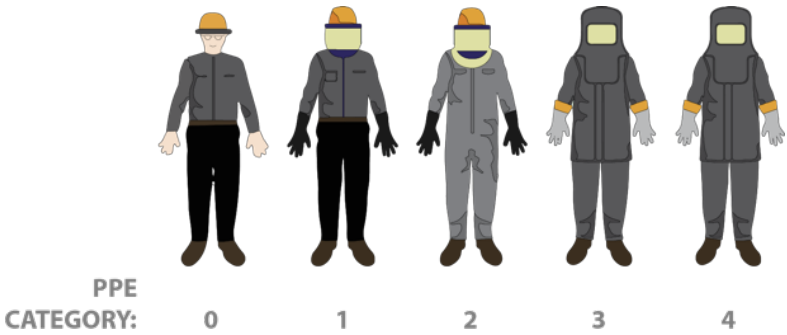
Many different levels of arc flash protection may be required, depending on the likely exposure:



Adapted by author from original work by:
Michael Olivo, P.E.
Aaron Ramirez, E.I.T.
Texas Department of Transportation

Under normal conditions and if appropriate work practices are followed, arborists and vegetation management workers should not be in close proximity to any arc flash. Different organisations recommend different levels of protection depending on working environment, working procedures and likelihood and severity of exposure.

Recommended minimum arc protection PPE for vegetation management work in the proximity of low voltage conductors includes (in conjunction with PPE requirements for the work task being conducted):

- Safety helmet (EN 397, EN 50365 standards for electrical insulation, or similar)
- Hearing protection (Minimum Class IV)
- Eye protection
- Ankle-to-wrist clothing made from natural fibre of no less than 185grams per square metre, or alternative arc flash protective materials
- Suitable gloves and footwear.

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Other PPE

A wide range of other PPE is required by different organisations, jurisdictions, working environments or work tasks. Arborists may use a wide variety of machinery, tools and chemicals to conduct many different work tasks.

It is beyond the scope of this document to list every possible requirement or article of PPE. Where organisational SWMS or SOPs, or the requirements of applicable legislation have identified the need for PPE when conducting a particular work task:

- The business must supply the PPE.
- The business must ensure that workers are suitably trained in the use of the PPE.
- The workers must wear the PPE when conducting the work task.

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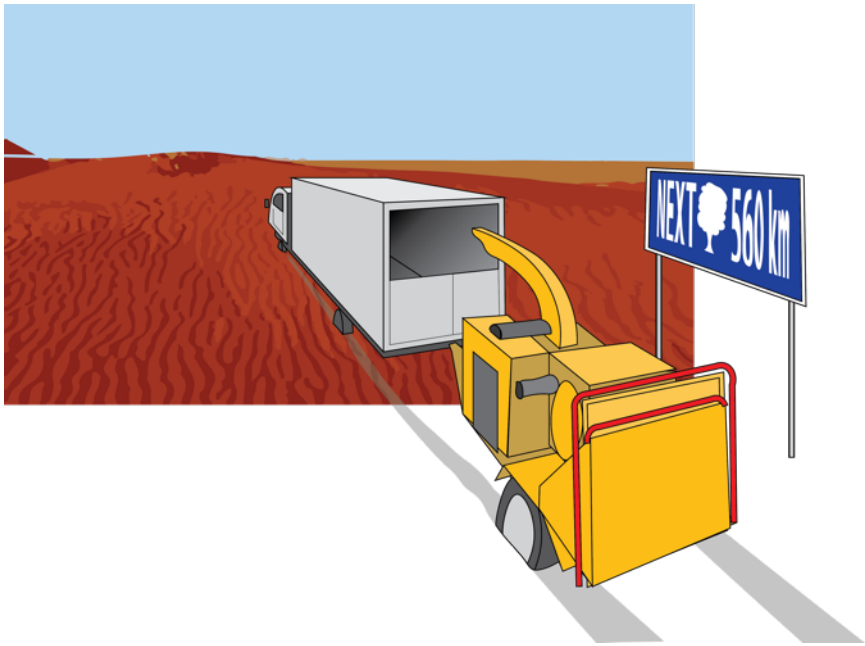
Working in remote areas



Arborists work in some of the most remote areas of Australia and New Zealand, pruning and removing trees in campgrounds, along powerline easements, along walking tracks, beside outback roads and bush tracks, in isolated communities, on islands and in other remote areas.

Working in remote areas can expose workers to additional risks and could make it harder to obtain assistance in the event of an accident.

Workers should consider the additional precautions on the following pages when working in remote areas:

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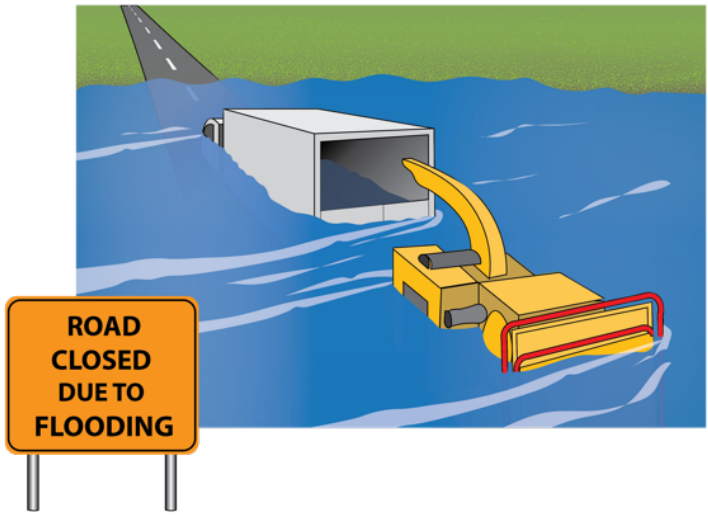
Preparing for remote area work:

- Check the weather and fire reports **before** you leave; it may be safer to do the work another day. Petrol-driven chainsaws must not be used on total fire ban days unless appropriate permits are obtained.
- Take a map of the area with you and take a compass or global positioning system (GPS) with you.
- Take a PLB (Personal Locator Beacon: an emergency device that sends out a homing signal to let people know where you are) with you.
- Ensure that you will have communications. Take a mobile phone or two-way radio, or both. For very remote areas, consider alternatives such as a satellite phone.
- Advise the office of where you are going and when you expect to return, and have a log-on / log-off process to ensure that if you fail to return the alarm can be raised.
- Collect all the PPE and equipment that you will need and take it with you. Consider taking spare parts for equipment if required.
- Take a filled personal water bottle, and enough spare water and food in case of vehicle breakdown.
- Ensure that your vehicle is in good condition, has been serviced, and is capable of travel in remote areas. Consider carrying additional fuel, oil, and appropriate spare parts including at least two spare tyres and rims. Check that the vehicle has a fire extinguisher and that it is current.
- Make sure a full remote-areas first aid kit has been collected from the office to take with you. Make sure the contents have been checked and include treatment for snake bite, shock and heat stress and major trauma. Many off-the-shelf first aid kits are not adequately equipped to respond to major blood loss.
- If possible, do **NOT** go out alone. Three people is a desirable minimum as if there is an accident, one person can stay with the injured person, while the other can seek help.

Travelling to remote areas; driving in the bush:

- Rest well before starting the trip.
- Start the trip early and avoid driving at dusk or after dark. Do not drive at the time of night when sleep would normally be occurring.
- Share the driving task: refrain from driving more than 10 hours in any 24-hour period. Stop for a 15-minute rest break every two hours or as needed.
- Observe speed limits and reduce speed to suit the road conditions. In some areas, expect to average no more than 40kph.
- Stay alert for animals, slow moving vehicles, oncoming vehicles and vehicles entering the road from farms or side roads
- Avoid road shoulders and allow ample road space when overtaking.
- Avoid undue risks such as driving across flooded creeks and observe all safety signs.
- Know the limitations of the vehicle e.g. a 4WD cannot go everywhere. Do not drive 2WD vehicles where safety signs recommend 4WD.



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Working in remote areas

- Do not move between areas outside your planned schedule without advising a supervisor or other appropriate party.
- Watch the time: make sure that you will be back when you said.
- Do not split up from your team.
- If you become lost or separated from the team, **stay where you are** - do not go wandering further into the bush.
- Be careful of snakes and do not provoke them. Avoid approaching any animals – all animals may become aggressive if cornered or injured.
- Do not drink creek water, it may be contaminated.
- In northern Australia, stay away from water edges wherever there may be saltwater crocodiles present.
- Stay back from cliff edges and waterfalls.
- Be careful of slippery rocks.
- If someone is injured and you are out of signal range, consider carefully before separating the party, particularly if you have only one vehicle.

When you return

- Contact your supervisor as soon as you are safely returned. Do not just turn off your phone and go home, no matter how tired or dirty you feel. A search party may be sent out in the meantime if it is suspected that you have not returned safely.
- Clean and return all the equipment you have borrowed (including the map, compass or GPS, EPIRB, mobile phone or two-way radio, PPE and first aid kit).

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3: Arriving on site

Approval to be on site

Before entering any site – whether a large development site or a residential yard – arborists must ensure that they have approval to enter.

Accessing property without approval from the property owner or occupier may be illegal and dangerous: there may be dogs, ongoing works or other unknown hazards. Arborists must not access any property without approval; this includes neighbouring properties where the tree overhangs.

Meeting the client or project manager on site will allow a proper discussion of the scope of work and will also allow the crew leader to confirm whether there are any known hazards, such as underground services or insect nests, or changes from when the job was quoted.

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Deciding on a work plan

A work plan or work strategy describes the sequence of steps and tasks that you will conduct in order to complete the scope of works. The work plan should consider:

- Safe work methods for each task.
- Efficient sequencing of tasks.
- Assigning crew members tasks for which they are competent.
- Scheduling regular breaks to avoid fatigue and dehydration.
- Efficient use of machinery to avoid manual handling.
- Siting machinery and mobile plant (such as wood chippers) in a suitable spot for efficient and safe operation.
- Planning how much work will be conducted so that the site can be left in a clean and safe condition at the end of the day.
- Rotation of work roles.

Be prepared to alter this work plan as the worksite changes, or as new hazards or environmental changes introduce new risks.

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Good tree work	Bad tree work
• Is **planned well**, with all crew members 'on the same page' with how the work will be conducted. • Is **sequenced well**; each work task is conducted in the correct order to clear space for the next. • Is **patient and unhurried**, well-ordered and calm, without trying to race through the work to get to the next job. • Is **correctly paced** to the processing capacity of other crew members. • Is **communicated well**, so that all crew members understand what is happening. • Is **conducted well**: each cut is accurately placed and the work is efficient and ordered. • Is **collaborative**, with good teamwork and all crew members contributing to safety and productivity. • Includes regularly scheduled breaks to ensure workers are not fatigued or dehydrated.	• Is **poorly planned**, with little discussion prior to starting work. • Is **badly sequenced**: effort is wasted with stuck branches, hangers and build-up of debris. • Is **hurried and chaotic.** • Is **incorrectly paced**: large pieces are sent down quicker than they can be processed and bottlenecks occur. • Is **badly communicated**: misunderstandings result in mishaps and lost tempers, decisions are made in frustration and the crew loses focus. • Is **conducted badly**: cuts don't line up, pieces go the wrong way or get hung up, lines are pinched, property gets broken or crew members get hurt.

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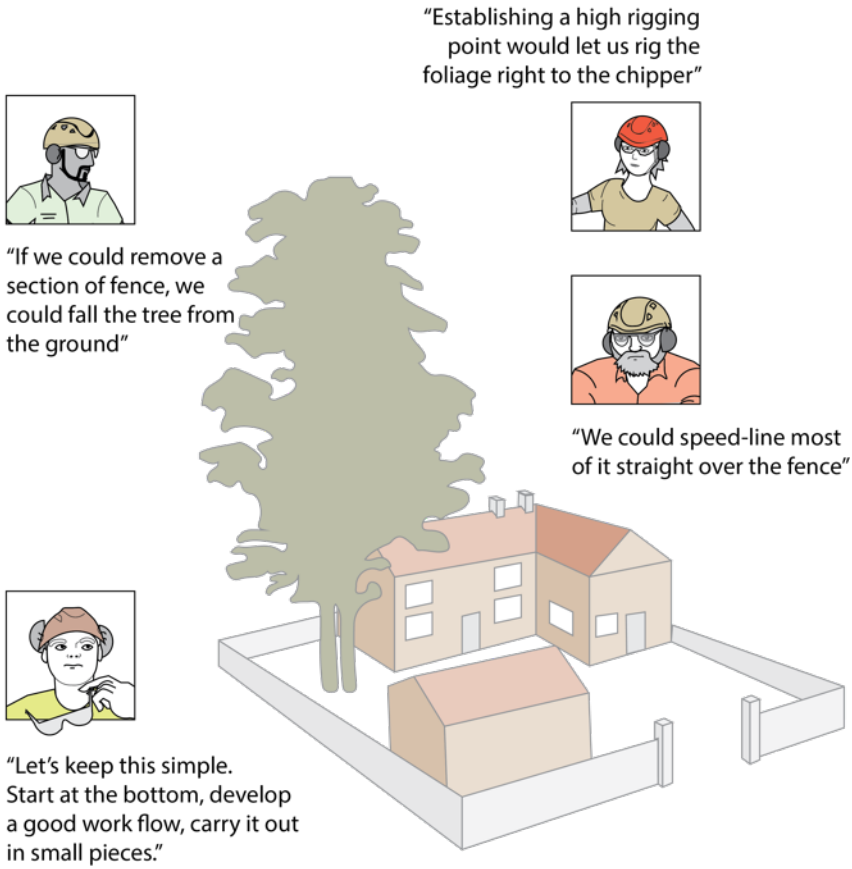
"Establishing a high rigging point would let us rig the foliage right to the chipper"
"If we could remove a section of fence, we could fall the tree from the ground"
"We could speed-line most of it straight over the fence"
"Let's keep this simple. Start at the bottom, develop a good work flow, carry it out in small pieces."

Different work plans may expose the crew to different risks. It is important to discuss the work together and decide on a plan, then check to see if there are any risks that you have missed. You may need to adjust the plan or introduce risk control measures.

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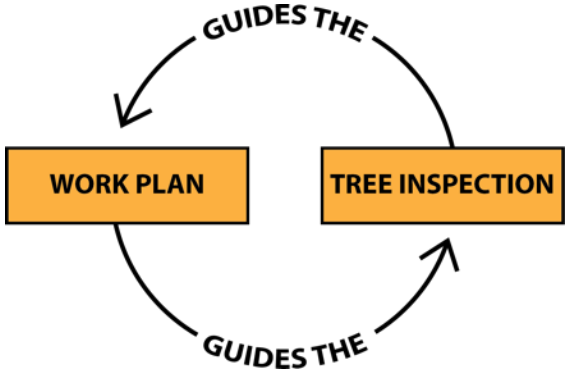
It is important to consider the work that will be conducted when carrying out site and tree inspections. Depending on the work that must be accomplished, a particular hazard may pose little risk, or it may be extremely dangerous.

For example, the tree may have a large cavity with extensive decay in the main trunk. This might be a high risk if the tree was to be climbed and lowered down in sections, but of little concern if the tree was to be accessed with an EWP and all of the sections could be dismantled using free-falling techniques.

Equally, when hazards are identified, it may be necessary to adjust the work plan to minimise or eliminate the risk. For example, a crew might plan to climb and dismantle a particular tree, but after conducting a tree inspection and identifying several hazards, the crew might decide to alter the work plan, remove a section of fence and fell the tree instead.



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Site and tree risk assessment

> *"The integrity of a tree is critical to the safety of those working in, under and around it. Before working on or accessing a tree by any method, a thorough visual assessment of the tree should be carried out by a competent person. The assessment should consider hazards, condition, wind loading, structural integrity and location. This assessment should form the basis of a site-specific risk assessment and decision-making on whether the tree is safe to access, the method chosen to access the tree and the safe systems of work to be used on the site."*
>
> *- Guide to Managing Risks in Tree Trimming and Removal Work, Safe Work Australia*[1]

Working with trees can expose arborists to many possible hazards. Studies have found that tree workers may experience an accident rate up to thirteen times the all-industry average[2].

To avoid these accidents, tree workers should embrace good work practices, safety-positive attitudes and a methodical and careful approach to planning and conducting work.

Good work practices always include a careful and thorough site and tree inspection. Early identification of hazards allows the whole crew to agree on work methods that will eliminate or reduce any hazards that have been identified.

It is always the practitioner's responsibility to inspect each tree on which work will be conducted, to identify hazards and to implement control measures.

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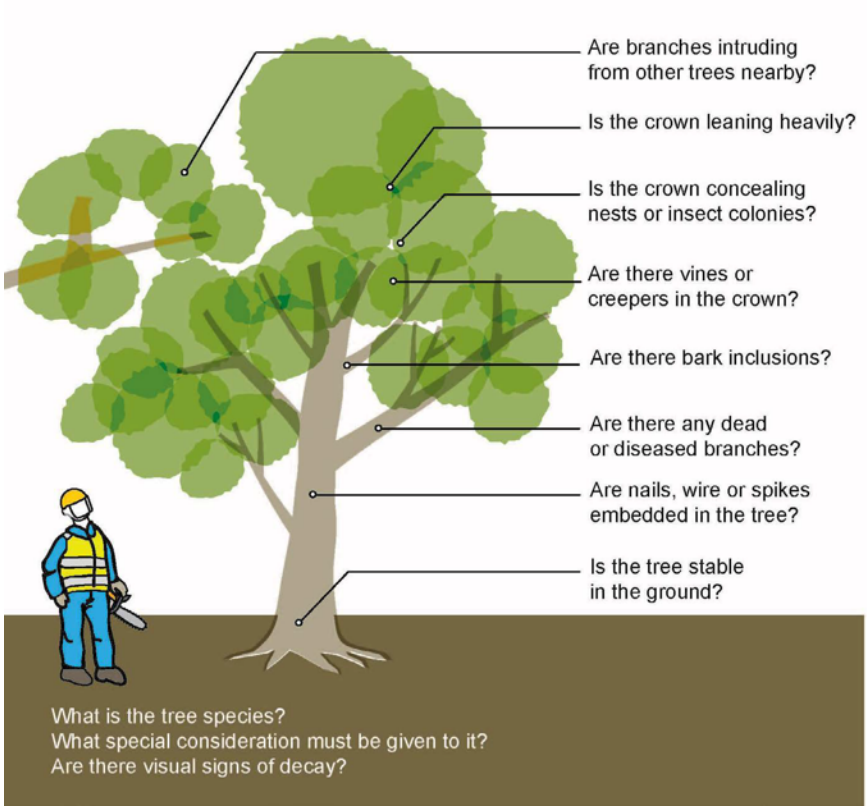
Are branches intruding from other trees nearby?
Is the crown leaning heavily?
Is the crown concealing nests or insect colonies?
Are there vines or creepers in the crown?
Are there bark inclusions?
Are there any dead or diseased branches?
Are nails, wire or spikes embedded in the tree?
Is the tree stable in the ground?
What is the tree species?
What special consideration must be given to it?
Are there visual signs of decay?

- Guide to Managing Risks in Tree Trimming and Removal Work, Safe Work Australia[1]

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Safe Work Method Statements and risk controls

All crew members must be familiar with the company Safe Work Method Statements (SWMS) or Safe Operating Procedures (SOPs) that apply to the work tasks that they will be performing.

Many hazards associated with tree work will be present at every site that the crew visits. The process of risk management for these hazards will have been conducted during development of the company SWMS or SOPs.

Where a hazard or risk is eliminated or sufficiently reduced by the control measures in the company SWMS or SOPs, there is no requirement to discuss or document additional control measures for that hazard at each worksite.

For example, the use of chainsaws is an inherently high-risk activity, however the implementation of control measures can reduce this risk to an acceptable level. These control measures do not need to be documented at every site where work will take place.

Chainsaw use:		
Risks include: • Cuts to self • Cuts to other people • Hearing damage • Eye damage • Muscular injuries • Impact with cut pieces **Risk rating:** **Moderate** likelihood of **Major** injury requiring medical treatment Risk rating = **CRITICAL**	**Control measures:** • Modern chainsaw with all safety features • Exclusion zones • Properly trained worker who is competent for the work task. • Correct saw use practices • Correct PPE supplied and worn at all times when operating chainsaw.	**Residual risk rating:** **Rare** likelihood of **Major** injury requiring medical treatment. Residual risk rating = **MODERATE** **Chainsaw works may be conducted only when all identified controls are in place.**

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When participating in site and tree inspections, workers are trying to identify risks that will not be addressed by the regular control measures in the company SWMS or SOPs.

This process will normally be conducted while filling out the Job Safety Analysis (JSA), Job Safety and Environment Analysis (JSEA), Hazard Assessment Checklist (HAC) or similar, although some organisations prefer to produce a site-specific SWMS for each work site that they visit.

Tree workers may visit multiple sites on each working day and complete a JSA for each site. It is not necessary to list all the control measures that are part of the company SWMS or SOP at each work site. Excessive paperwork can result in rushed or nominal site and tree inspections and can detract from safety outcomes.

Where hazards exist that are not addressed by the company SWMS or SOPs, these must be identified and recorded on the JSA. For works to proceed, it will be necessary to identify and implement control measures to minimise or eliminate each risk.

It is important for all workers to continue to monitor the site and works and to review the effectiveness of control measures.

When the site conditions change, when new works are conducted, or whenever a new worker arrives on site, works must stop until all crew members have discussed and agreed the control measures that are being implemented.

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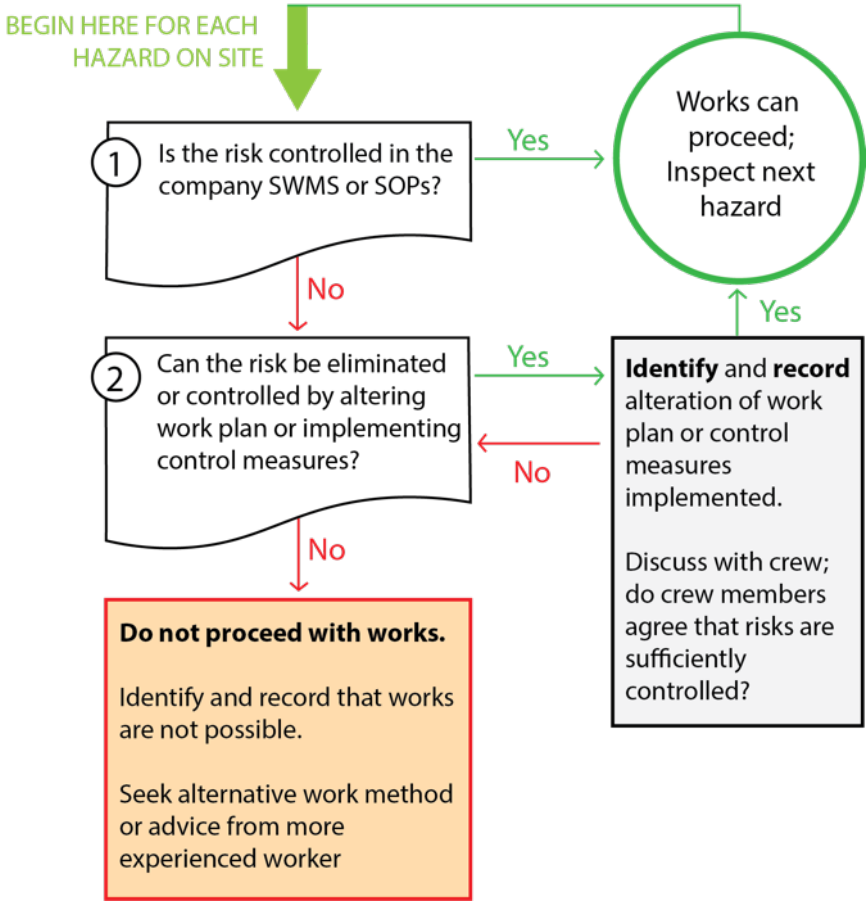
RISK ASSESSMENT FOR SITE AND TREE INSPECTION


BEGIN HERE FOR EACH HAZARD ON SITE
1
Is the risk controlled in the company SWMS or SOPs?
Yes
Works can proceed; Inspect next hazard
No
Yes
2
Can the risk be eliminated or controlled by altering work plan or implementing control measures?
Yes
No
Identify and record alteration of work plan or control measures implemented.
Discuss with crew; do crew members agree that risks are sufficiently controlled?
No
Do not proceed with works.
Identify and record that works are not possible.
Seek alternative work method or advice from more experienced worker

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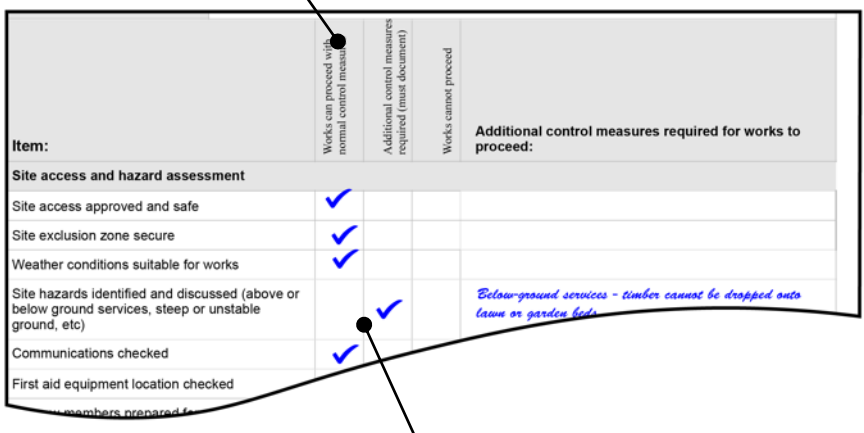
Recording site and tree inspection

Site hazard inspections will normally be documented on the JSA, JSEA or HAC, although a site-specific SWMS may be used instead. It is important to record where hazards were not addressed by the company SWMS or SOP, and additional control measures were required (see below).

Some tree work sites may have a hundred or more separate trees on which work will be undertaken. Tree hazard inspections will normally be performed by the competent worker who will be working on the tree and are not usually individually documented.

Example:

The crew leader has checked this element of the JSA, and confirmed that works can proceed with no additional control measures



Item:	Works can proceed with normal control measures	Additional control measures required (must document)	Works cannot proceed	Additional control measures required for works to proceed:
Site access and hazard assessment				
Site access approved and safe	✓			
Site exclusion zone secure	✓			
Weather conditions suitable for works	✓			
Site hazards identified and discussed (above or below ground services, steep or unstable ground, etc)		✓		*Below-ground services - timber cannot be dropped onto lawn or garden beds*
Communications checked	✓			
First aid equipment location checked				

In this case, a hazard has been identified that was not addressed in the company SWMS. An additional control measure has been introduced before works can proceed.

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Completing the JSA or similar

Completing the JSA or similar site-specific risk assessment also provides an opportunity to check and record some of the hazard control measures and preparations for work that will be common to every site.

Location

It is important that the work site location is documented and communicated to the whole crew. It may seem obvious, but if crew members arrive on site as passengers or in convoy, they may not know the work address. Being able to give useful, clear instructions to emergency services personnel may save critical time in the event of an accident.

In addition, ensure that all crew know the best methods of access for emergency services. In large or remote sites, just giving the address may not be enough. Give all crew clear instructions about how the emergency services can access the site, where the meeting point will be, where the gates are open, etc.

The ‘What3Words’ app can assist with specifying locations in rural or wilderness locations.

Emergency access

In addition, ensure that all crew know the most appropriate access point for emergency services. On large or remote work sites, just giving the address may not be enough. Give all crew clear instructions about how the emergency services can access the site, where the emergency meeting point will be, where the gates are open, etc.

Always have a safety vehicle parked in an open area away from hazards with a clear path to leave the site if required.

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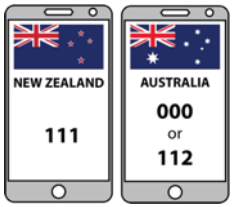
Communication



In the event of an accident, it is critical that communication devices are readily available to contact emergency services personnel. For most tree work, this means ensuring that **at least one mobile phone has service coverage and sufficient battery life**.

Check there is no lock code on the phone or that all crew know the lock code in order to use the mobile device. Emergency calls can usually still be made from locked phones, but other possible calls for help, for example to other crew members working in the area, will be prohibited.

In rural or remote areas, alternative forms of communication should be considered. For example:

1. UHF device or radio (check range)
2. GSM or satellite phone
3. Personal Locator Beacon (PLB)

The use of emergency apps may help crews to contact assistance and provide accurate locations.

All tree work jobs should be recorded in the workplace schedule / diary, so others in the office know the location of each crew. If a crew does not return when expected, the office will know where they are.

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First aid kit

A good first aid kit must be accessible and fully stocked at all times. Kits should be regularly checked and suitable for the types of injury that occur on tree work sites. Sufficient blood-stopping bandages or wadding must be included for potential chainsaw injuries. Many 'off-the-shelf' occupational first-aid kits do not include sufficient blood-stopping bandages to respond to serious chainsaw wounds.

The following specialist first-aid equipment may be considered if crew members are suitably trained and competent to use it in the event of an accident:

- tourniquet kit
- blood coagulant/haemostatic agent
- neck brace
- crew-specific medication such as EpiPens or similar as required.

Ensure that all crew members are competent in first aid. Note that the specialised equipment listed above will require additional training above that provided in basic first aid courses.

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Fire control

Fire extinguishers should be kept in each vehicle with their location clearly marked. They should not be locked away; and must be easy to get to in an emergency.

Fire extinguishers should be inspected every six months and must be in good working order. Some clients or high-risk fire areas will require fire units on the back of vehicles. Weather reports should be conducted hourly for the local area in case a total fire ban has been implemented.

In New Zealand, the NZ rural firewatch website https://fireweather.niwa.co.nz may be useful to check whether there are active fires near a planned worksite.

Crew

Crew members must be suitably trained and competent for their designated work roles.

Working with inexperienced or new crew members can dramatically increase the chance of a serious injury, both to the new crew member and to everyone else in the team. Ensure inexperienced or new workers are carefully supervised.

Ensure that all crew members are free from the effects of alcohol or drugs, are not fatigued, are adequately hydrated and have a positive attitude toward safety on site.

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Emergency plan

Regulations throughout Australia and New Zealand require suitable provision for the event of an emergency on all tree work sites[2,3,7] - this includes the requirement if tree climbing is taking place, that:

> "*The climbing crew should consist of at least two workers with one worker to stay on the ground as a safety observer or spotter. The nominated ground worker should also be trained in aerial rescue techniques."*
>
> -Safe Work Australia guide to managing risks in tree trimming and removal, 2016

Note that rescue climbers will need suitable equipment that will allow them to access the tree and conduct a rescue in the event of an emergency.

See **MIS304 Aerial Rescue** for more details.

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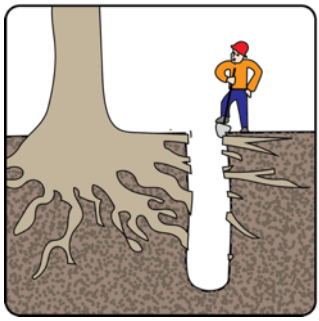
Site hazards

The following pages provide some examples of potential site hazards that can be found on tree work sites.

Note that this list is not exhaustive, and many other potential hazards exist. Every site must be inspected carefully and any potential hazard considered.



Uneven or disturbed ground

Are there any ground hazards on site that will make it dangerous to access or work? Look for hazards such as steep gradients, uneven ground, excavations or gullies.

Excavations may cause trip or fall hazards and may damage the structural roots of trees.

Insects or wildlife

Look carefully for ground-based and arboreal insect or animal habitat. Many species of Australian insects may be aggressive or poisonous. Look carefully for wildlife such as bats, koalas, gliders and birds. Trees used as habitat by specific species may be legally protected; special permissions may be required for removal or pruning.

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Hangers

A hanger occurs where a branch or tree part has failed and become caught or suspended within the tree.

Hangers can be dead or living and can be completely detached or still partially attached to their original union. Sometimes whole trees will be hung up.

While some hangers can become securely lodged and stay suspended for many years, others may become easily dislodged while installing lines or moving through the tree.

Allergenic plants or vines

Depending on the worksite location, there may be a wide range of toxic or allergic plants on site.

Dense vines or understorey plants may also hide other hazards and should be inspected carefully.

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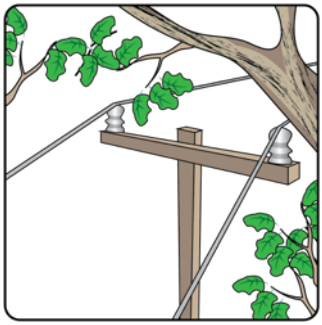
Electrical conductors and other services



Contact with electrical conductors is a common cause of injury or fatality on tree work sites[2].

Take the time to ensure that any electrical conductors on site have been positively identified before starting work, and that all crew members have been made aware of their location. Ensure that any tree work to take place will not bring workers, machinery or tree parts within Ordinary Persons Safe Approach Distances (SAD). Further details on these distances can be obtained from relevant state WHS policies.

Many other types of above and below ground services are present on tree work sites, including telecommunications, water and sewerage services and gas.

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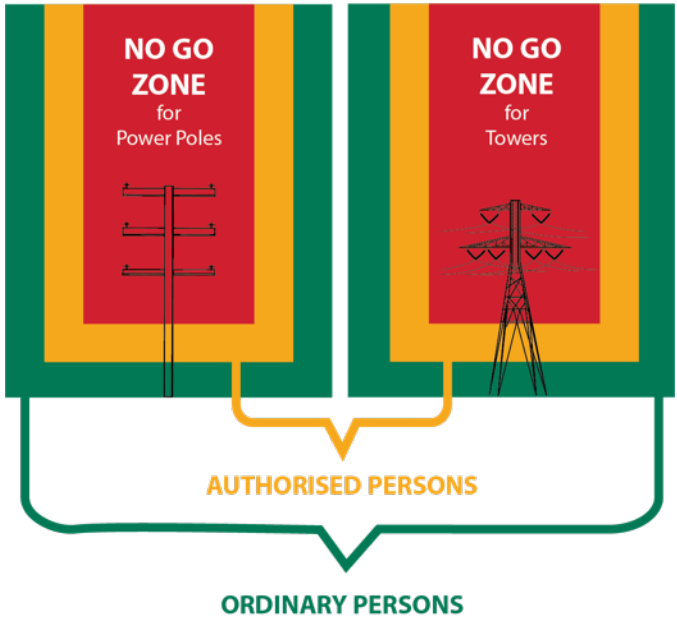
Above-ground conductors

There have been a number of fatalities in the arboricultural industry due to contact with electrical conductors. Trees often grow in proximity to conductors, and workers can be killed or injured when tree parts contact wires during pruning or removal work.

Each jurisdiction and many different network authorities have different regulations governing how close workers or tree parts can get to energised conductors during work; specific training will always be required. Vegetation management in the vicinity of electrical assets requires additional training that is beyond the scope of this document.



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According to the *Guide to managing risks of tree trimming and removal work*:

"Most risks can be addressed by observing safe working distances for workers and plant when near overhead electric lines. The distances will depend on the type of work being carried out and the voltage of the overhead electric lines.

[The table below] provides examples of control measures when operating in the vicinity of overhead electric lines."

Examples of control measures when operating in the vicinity of overhead electric lines
• Ensuring no person, plant or equipment goes too close to overhead electric lines by using a safety observer (spotter) on the ground who has received training on working in the vicinity of overhead electric lines. • Providing and maintaining insulated tools and equipment; e.g. an EWP that is tested regularly. • Connecting the chassis of the EWP to the ground by braided copper cabling or metal earthing spikes when working near high voltage electric lines. • Using PPE e.g. cotton or fire-retardant, long sleeved clothing, insulating gloves, protective non-slip safety boots and a safety helmet. • Contacting the Electricity Supply Authority or Electricity Regulator to find out the extent of work zones, approach distances and specific work requirements that apply to ordinary persons working in the vicinity of overhead electric lines e.g. getting a permit to work when likely to come within approach distances.

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Below-ground conductors and other services

The location of underground conductors, telecommunications cables, and water and gas services must be located before beginning work.

These services can be damaged when heavy machinery is used, when digging or grinding takes place, and even when heavy timber is dropped, or trees are felled onto them.

The use of a service such as 'Dial Before You Dig' to locate underground assets should be undertaken, which can provide information on the presence of plant equipment such as cables and pipes.

Underground location plans provide information about plant presence, but do not pinpoint the exact location of cables and pipes.

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Weather conditions

Tree workers experience a wide range of weather conditions - everything from ice and snow on tree branches in Invercargill, to the tropical monsoons of the wet season in the Northern Territory. Weather conditions such as high or gusty winds, excessive heat or heavy rain may prevent tree work, or may require alterations to a work plan for works to be safely completed.

Some weather conditions that may affect tree work are shown in the table below, however these are presented as a guide only, as different tree work will impose different safety benchmarks: pruning juvenile trees using secateurs might be safe to do during steady rain on a windy day, but doing the same work on a mature specimen in the same conditions might be extremely dangerous.

Consider your work plan when assessing weather conditions. In inclement conditions, consider rescheduling work and returning during better weather. This is almost always more productive!

Weather condition	Potential impact on work plan	Possible control measures
Temperatures above 36°C or **humidity above 85%, if temperature is above 30°C.**	• Crew fatigue, heat stroke or dehydration	• Consider rescheduling work • Ensure crew take regular breaks • Use hydration backpacks or similar to maintain fluid levels • Decrease the work pace • Actively manage fatigue. Look for crew members taking shortcuts and rest them

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Weather condition	Potential impact on work plan	Possible control measures
Temperature below 5°C (including wind chill factor reducing temperature to below 5°C)	• Crew fatigue accelerated • Tree branches can be slippery if ice is present	• Consider rescheduling work • Ensure crew take regular breaks • Ensure all crew are suitably dressed and not getting cold • Actively manage fatigue. Look for crew members taking shortcuts and rest them
Wind speed above 25 Knots (approximately 60 km/h), or gusty winds with sudden high speeds	• Communication can be difficult • Dropped branches will 'sail' • Wind gusts may break branches/leaders	• Consider rescheduling work • Assess tree carefully to identify any potential hazards • Use communication equipment (UHF or bluetooth) to maintain communication
Rain	• Communication can be difficult • Some climbing work in some species of tree can be challenging due to slippery surfaces, rope angles etc	• Consider rescheduling work • Look for alternatives to tree climbing • Use communication equipment (UHF or Bluetooth) to maintain communication

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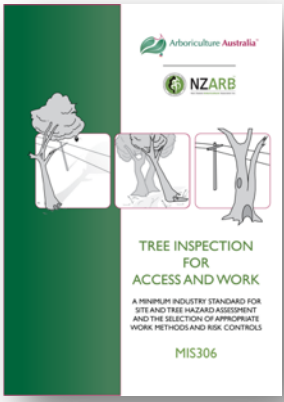
Tree hazards


Arboriculture Australia
NZARB
TREE INSPECTION
FOR
ACCESS AND WORK
A MINIMUM INDUSTRY STANDARD FOR SITE AND TREE HAZARD ASSESSMENT AND THE SELECTION OF APPROPRIATE WORK METHODS AND RISK CONTROLS
MIS306

In addition to the site inspection, each tree must be carefully inspected by the arborist before beginning work.

It is not common for each tree inspection to be individually documented. For some tree crews, a site might include several hundred trees to be worked on or felled. It is part of the competence and responsibility of the practitioner to inspect the tree, and decide on a suitable work method, before conducting tree works.

Where tree hazards will prevent the tree from being accessed, or will require additional specific control measures or work method alterations, this should be recorded on the JSA, JSEA or HAC.

Please see **MIS306 Tree Inspection for Access and Work** for further details of tree hazards and control measures for tree works.

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Environmental impact and control measures

All workplaces are responsible for how their work practices impact the environment. Environmental legislation and regulations vary depending on the particular work that is undertaken.

Environmental protection requirements include:

- Following an environmental management plan (at a workplace or project level)
- Waste/clean-up management
- Water quality protection
- Noise control
- Dust/debris management.

Environmental management plan

An environmental management plan outlines steps and processes required to prevent or minimise environmental harm from machinery, equipment and hazardous materials.

You are required to:

- Identify the requirements and constraints that affect the work that will be conducted
- Confirm any parts of the plan that seem unclear
- Apply, and comply with, environmental protection requirements in the tasks that are performed.

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Waste/clean-up management plan

Waste/clean-up management plans include plans for:

- Disposal of site waste materials and rubbish
- Recycling of waste materials
- Reuse of waste materials. This may also list methods for:
    - Limiting the types or amounts of chemicals used and how they are handled
    - Dealing with hazardous wastes, chemical wastes and other classes of waste (if relevant).

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Water quality protection

Water protection measures may require chemicals and debris be directed to areas where it will not escape into the stormwater system or other waterways. Both Australia and New Zealand regulations impose severe penalties for accidental contamination of waterways.

This may require tree workers to carry spill kits when working near water courses and in some environmentally sensitive areas. Tree workers should select fuelling sites that eliminate the possibility of water contamination with spilled fuel or oil.

Noise control

Limit use of chainsaws to acceptable operating times so that noise pollution is not a problem for neighbours or other people in the area.

Noise reduction methods may include:

- Using noise-deadening materials (if appropriate)
- Constructing noise barriers, screens or enclosures to reduce noise
- Restricting hours of operation between 6pm and 7am; consider the use of battery powered or hand saws if working within these hours.

Dust/debris management

Techniques for controlling dust and debris may include using:

- Dust screens if practicable
- Tools and equipment in areas with adequate ventilation.

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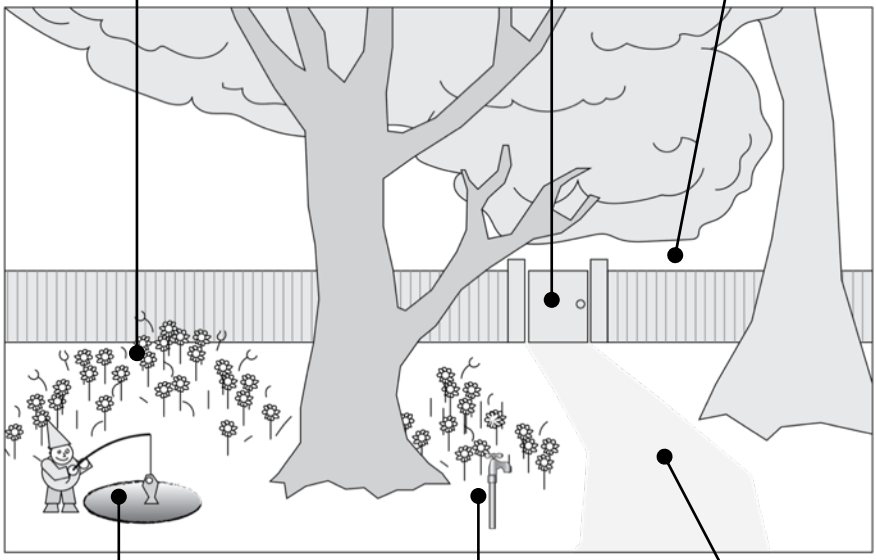
Site setup and preparations for work

Preparing the site

Are garden beds to be protected? Are there any areas where plants could be moved to make a drop or lowering zone?

Does material need to be dragged through a gate for processing? Is it wide enough? Can a section of fence be removed? If so, could the tree be felled from the ground through the gap?

Is there parking on the street? Will traffic management be required?



Garden ornaments – can they be moved? If not, can they be protected or clearly marked so that they can be seen from the tree?

Irrigation, taps or other underground services. Mark or protect above-ground services and consider whether below-ground structures can be damaged during tree removal.

Pathways and access – can they be closed? If so, are there any times they must be open?

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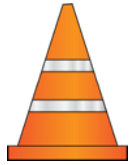
Work site exclusion zones



A site or work exclusion zone is a critical element of safety when conducting tree work. Exclusion zones prevent members of the public from entering work sites and help to ensure all crew members wear PPE and follow site safety control measures when entering the site.

In sites with public access such as public spaces, footpaths and roads, ensure that exclusion zones are enforced with clear, appropriate signage, as well as barrier tape or similar to prevent members of the public and non-authorised persons from entering the worksite.

Even in areas with no public access, such as private gardens or enclosed areas, designate an exclusion zone (consider using traffic cones or marking tape to make the exclusion zone boundaries clear) and enforce the requirement for suitable PPE and attention at all times when within the designated area. The use of a designated worksite or similar area helps to:

- Ensure that all crew wear the correct PPE whenever entering the worksite (for example when arriving on site or returning from a break).
- Ensure that crew within the worksite are paying attention to work. Activities like smoking, making phone calls, checking social media or eating should be conducted outside the exclusion zone, to ensure that crew are not injured while their attention is distracted.
- Remind crew that whenever entering the worksite, they must ensure they understand the work that is being conducted and maintain communication with other crew members within the site as required.
- Ensure that all new crew members and visitors have signed on to the JSA and have had all site and tree hazards identified to them.

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Signs

Signs such as those below should be used whenever working in an area with public access. Additional signage may be necessary when working near roads or using some machinery.

On some worksites, additional signage or flagging tape is used to identify the drop zone exclusion area. This area is a no-go zone for anyone who does not have the aerial worker's permission to enter.

Traffic management

The requirements for traffic management are identified in the Australian ***Road Safety (Traffic Management) Regulations 2009***, the New Zealand ***Code of practice for temporary traffic management***, or in other local regulations.

Clear guidance on when traffic management is required, along with sample traffic management plans and even self-assessment tools, are available from most state and territory WHS bodies and from state roads departments. Use this information whenever working in close proximity to traffic.

Businesses that regularly conduct work in the vicinity of traffic should consider additional competency training in traffic management.

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Emergency preparations

In addition to following industry best practice to minimise the possibility of an accident, it is a requirement on Australian and New Zealand work sites[2,3,7] that suitable provision for an emergency is made prior to work commencing.

Suitable preparation for an emergency includes preparations such as:

- The provision of a first aid kit
- Ensuring that emergency communications are available
- Confirming the job location and emergency access
- Firefighting equipment such as a knapsack, rakehoe and fire extinguisher
- Developing an emergency plan so that everyone knows their role and responsibilities when something goes wrong
- Ensuring that a suitable reliable vehicle is parked ready to evacuate, not blocked in by felled trees or other debris.

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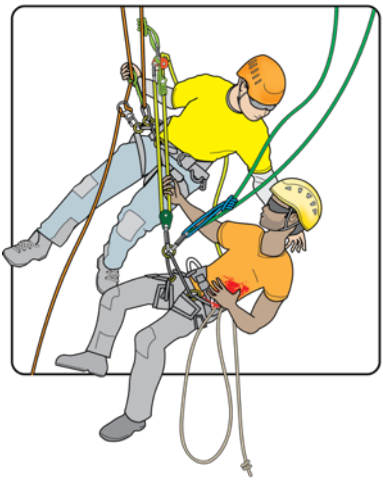
Aerial rescue

In the case of aerial tree work, for example tree climbing or aerial lift operation, it is a requirement that the tree crew is able to perform an aerial rescue[1,7].

Aerial rescue is defined in arboriculture as 'bringing an injured [or stuck] worker down from a tree or aerial lift device'[4].



Rescue plan

Before starting any aerial tree work, suitable preparation for the event of an aerial rescue must have been made.

This means that the crew must have a way of accessing and assisting the aerial worker in the event that the aerial worker is injured or incapacitated.

More information on tree access methods and aerial rescue is provided in the following Minimum Industry Standards:

MIS304 Aerial Rescue

MIS305 Tree Climbing

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Pre-start checks

Pre-start checks describe pre-use inspection is to ensure that the machine is safe to operate. A defective machine could easily endanger the life of its operator, as well as the lives of crew mates working in close proximity.

Pre-use checks for PPE are provided in the PPE section on page 22.

All arboricultural machinery, equipment and tools will require pre-start checks. Aerial workers are required to check all of their height safety equipment prior to leaving the ground, and pre-start checks are usually required for vehicles, Elevated Work Platforms, chippers, and other machinery.

Further details on the pre-start checks and routing preparation for use for these tools and machines can be found:

- In applicable Codes or Guidelines
- In Australian standards
- In the relevant Minimum Industry Standards
- In the manufacturer's instructions or operator manual
- In the company SWMS or SOPs.

Please see the following page for an example pre-start checklist for a generic chainsaw.

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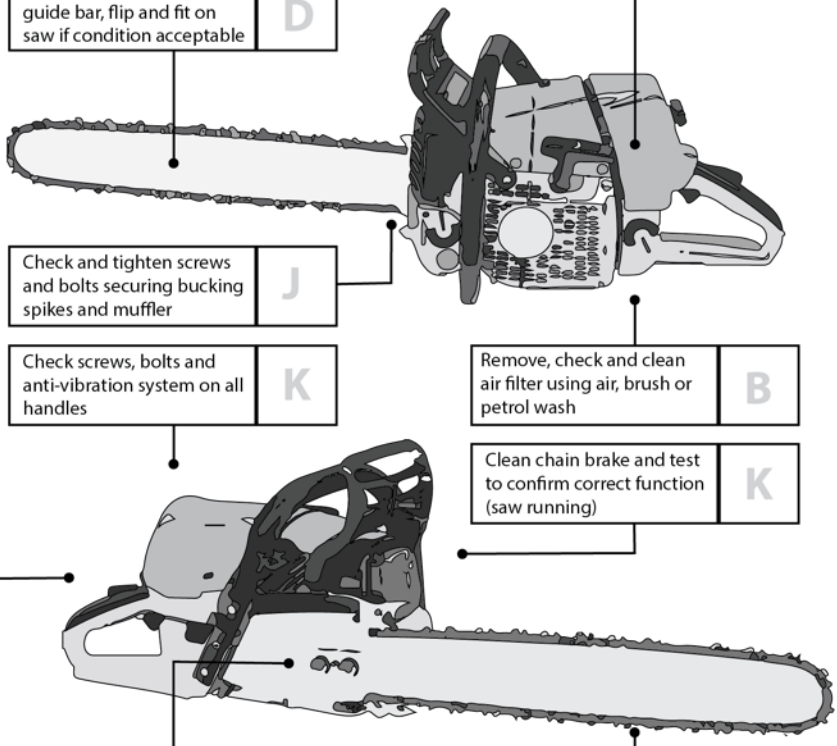
GENERIC CHAINSAW PRESTART CHECKLIST:

USE MANUFACTURER'S CHECKLIST IF AVAILABLE


Remove, clean, and dress guide bar as required to remove any burrs
C
Clean saw body, air intake vents and cooling fins as required
A
Check straightness of guide bar, flip and fit on saw if condition acceptable
D
Check and tighten screws and bolts securing bucking spikes and muffler
J
Check screws, bolts and anti-vibration system on all handles
K
Remove, check and clean air filter using air, brush or petrol wash
B
Clean chain brake and test to confirm correct function (saw running)
K
Check bar nuts, confirm side cover fitted correctly and bar nuts tightened
H
Fill fuel and oil tanks ensuring that no leaks are evident
I
Check that the stop switch works and the bar oil is flowing (saw running)
J
Inspect saw chain - check pitch and gauge of chain and sharpen correctly
E
Adjust chain to correct tension for saw use
F
Replace chain that is worn, damaged or incorrectly sharpened
G

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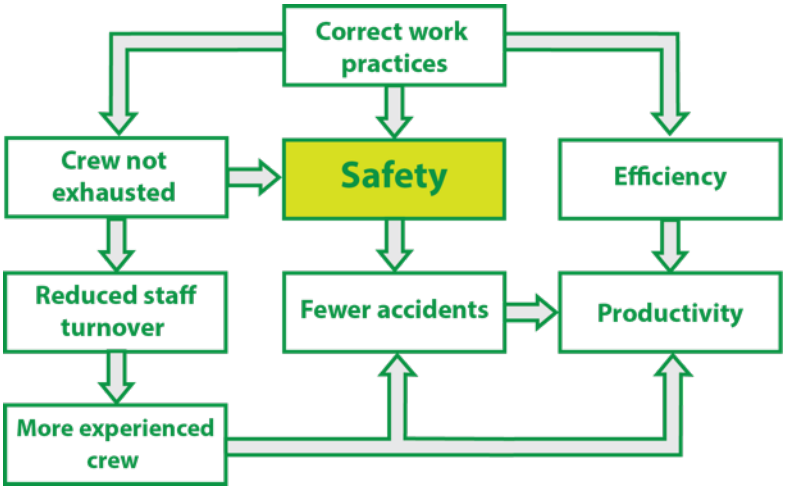
4: Conducting tree work

Safe work practices: accident prevention methods

Prevention is better than cure. For this reason, the arboricultural industry has developed accident prevention methods.



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Examples of safe work practices

1. Staff who are trained and competent for their work roles
2. Adequate supervision of inexperienced workers
3. Good work practices, including fundamentals of safe tree work, such as making cuts with a good body position using correct chainsaw techniques
4. Fit, healthy workers who are free from the effects of alcohol and drugs
5. Safe, appropriate, well maintained equipment
6. Proper storage facilities
7. Identifying electrical conductors and maintaining limits of approach
8. Safety signs, barricades, exclusion zones
9. Completing a site-specific risk assessment by identifying work health and safety hazards and assessing risk
10. Crew with a positive attitude to safety who follow best practice
11. Good, clear communication on site
12. Complying with work health and safety responsibilities including duty of care, relevant Standards, codes of practice and organisational safe work method statements (SWMSs) or similar
13. Correct personal protective equipment (PPE).

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Work is conducted safely and methodically according to organisational procedures
Company and crew share a professional attitude and are proactive about safety
Communication
positive safety attitude - not seen as a joke or a waste of time
enough money on job to do it properly
Time
Attitude
no shortcuts - do it the safe way not the quick way
company proactive about safety
Safety
Good communication within crew and within company ties everything together
equipment is in good condition and fit for purpose
Experience
good, thorough training, qualifications and mentorship
whole crew experienced and share work practices
Crew are competent for their work tasks and will recognise and discontinue work when it exceeds their ability or is not possible without additional resources

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Avoiding accidents on tree work sites requires a good, trained and experienced crew, with a positive attitude toward safety and enough time to do the job properly without taking shortcuts.

Inexperienced crew members should be mentored closely while they learn how to conduct their roles and to work safely with the rest of the crew.

The diagram on the previous page shows how some of these qualities inter-relate and inform each other. Maintaining good, clear communication throughout tree work activities ensures that the crew can support each other and identify potential hazards.

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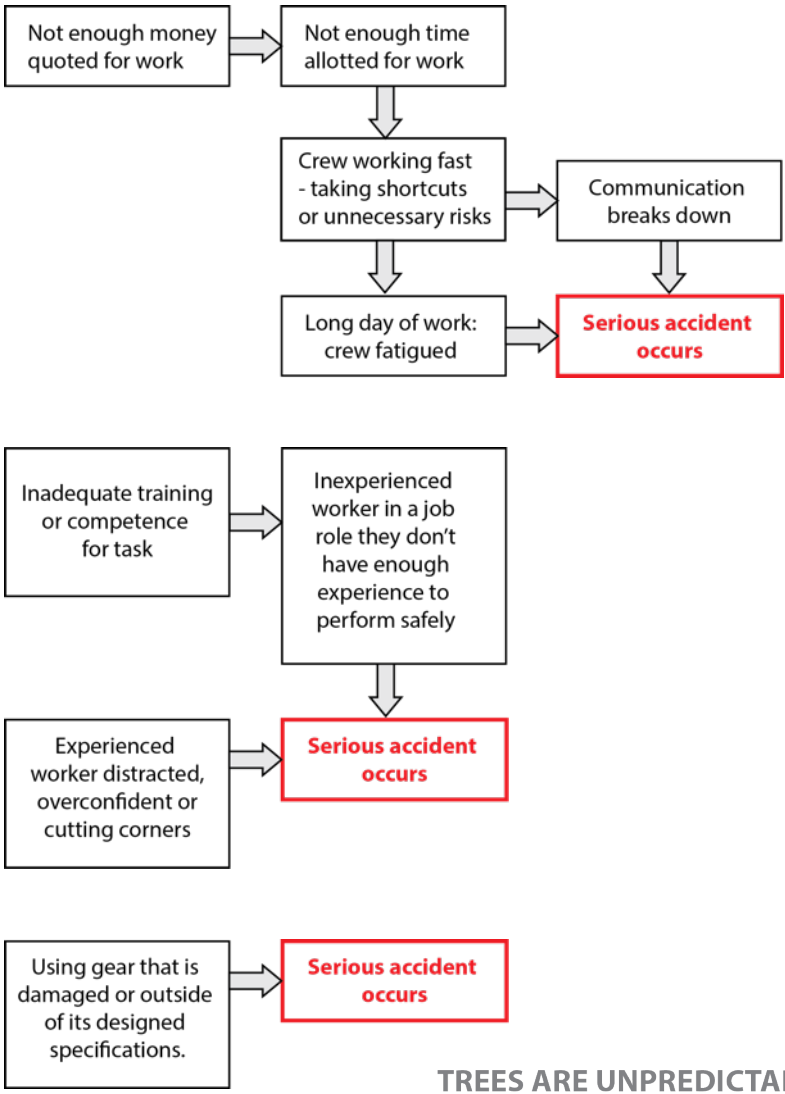
Accidents occur on tree sites where:


Not enough money quoted for work
Not enough time allotted for work
Crew working fast - taking shortcuts or unnecessary risks
Communication breaks down
Long day of work: crew fatigued
Serious accident occurs
Inadequate training or competence for task
Inexperienced worker in a job role they don't have enough experience to perform safely
Experienced worker distracted, overconfident or cutting corners
Serious accident occurs
Using gear that is damaged or outside of its designed specifications.
Serious accident occurs

**TREES ARE UNPREDICTABLE;
EVEN IF ALL CARE IS TAKEN
ACCIDENTS CAN STILL HAPPEN**

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Accident warning signs

There may be many warning signs before a serious accident occurs.

- Are lots of smaller accidents happening?
- Are there miscommunications?
- Are crew members stressed or attempting work roles they are not qualified or experienced enough for?
- Are crew members distracted?
- Has it been a long day or a long week?
- Are the crew rushing to get work done?

If the answer to these questions is yes, it is your responsibility to:

Everyone on site has the right to say stop, even the first-year apprentice.

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Basic site safety rules

Whenever workers are on site, in particular when within tree work exclusion zones, it is critical that they are focused on the work being conducted.

Workers who are looking at their phones, making a sandwich or rolling a cigarette are not paying sufficient attention. Dropped logs, felled trees or moving plant will catch them unaware.

When within a designated exclusion or work zone, tree workers must always:

- Be wearing all appropriate PPE. When entering a worksite always check PPE is correctly worn and suitable.
- Be focused on the work being conducted. When entering a worksite check to see what work is being conducted. Look up to check the position of any aerial workers: do not just walk straight out into drop zones.
- Avoid distractions. If an urgent phone call is received or the worker needs a break, stepping outside the exclusion zone will avoid the potential for accidents caused by lack of attention.

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Work methods

Tree work can be physically demanding, particularly in hot or humid weather or where loads must be moved or dragged a long distance.

Lifting heavy loads or dragging large branches will increase fatigue and may cause muscular injury. It is always safer and more productive to find efficient work methods that can be sustained throughout the working week without exhaustion.

Manual handling

Lifting heavy loads will cause slipped disks, compressed spine, torn ligaments, knee cartilage damage, hernias and long-term muscular injuries, will increase fatigue and may result in accidents.

While it may seem quicker to lift or drag heavier loads, developing an efficient workflow that doesn't leave workers exhausted will always be safer and more productive over time.

- Always cut pieces to a manageable size.
- Seek assistance with lifting heavier loads.
- Use appropriate manual handling techniques.
- Where possible, use appropriate machines to lift and move loads instead of manual labour.

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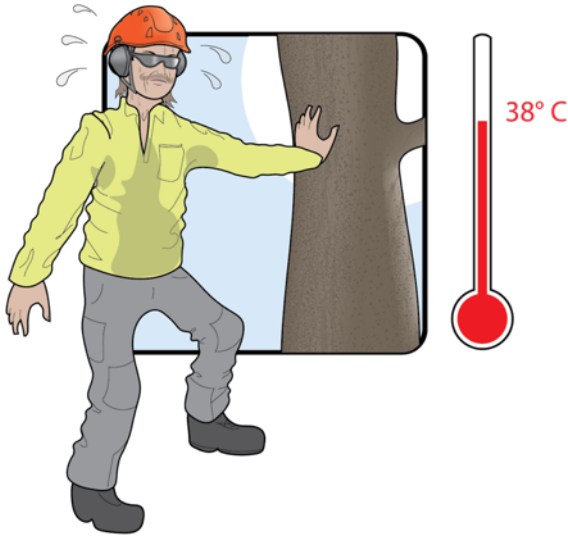
Heat stress and dehydration



Heat stress and dehydration are risks that many tree workers in frequently experience.

The combination of hot temperatures, direct sun, humidity and manual labour can make regulating body temperature and maintaining fluids into a daily challenge.

The use of chainsaw protective clothing may also make the wearer more susceptible to heat stress. In hot conditions, wearing chainsaw protective clothing may decrease the evaporation of perspiration and impact the body's natural cooling mechanisms.

Some businesses choose to define specific temperatures above which work will not be conducted.

In some parts of Australia and New Zealand, temperatures may remain above these designated levels for weeks at a time. In addition, different crew members may have different susceptibilities, and the type and intensity of work will also impact the problems of dehydration and heat stress.

Workers have been hospitalised or killed through exposure to both dehydration and heat stress. As well as the direct effects, both dehydration and heat stress increase fatigue, reduce concentration, impact decision-making ability and can lead to dangerous mistakes.

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Controlling heat stress and dehydration

Every worker is different, and every worker experiences heat stress and dehydration at different rates.

Workers can become dehydrated or suffer from heat stroke on comparatively mild days.

The following control measures should be considered whenever exposure to heat stress is a possibility:

- Consider rescheduling work to avoid physically demanding work on very hot or humid days where possible.
- Ensure the crew take regular breaks. By the time crew members notice dehydration in themselves, it is probably too late. Setting a good work schedule and taking appropriate breaks will increase productivity and safety.
- Use hydration backpacks or similar to maintain fluid levels. Ensuring that crew members have continuous access to water will help to avoid dehydration.
- Decrease the work pace. High-intensity work cannot be sustained and will raise body temperatures and increase both dehydration and heat stress.
- Look for other ways of doing the work: can manual handling be conducted with a machine? Can an EWP be used instead of climbing?
- Actively manage fatigue: look for crew members who are struggling and taking shortcuts and rest them.

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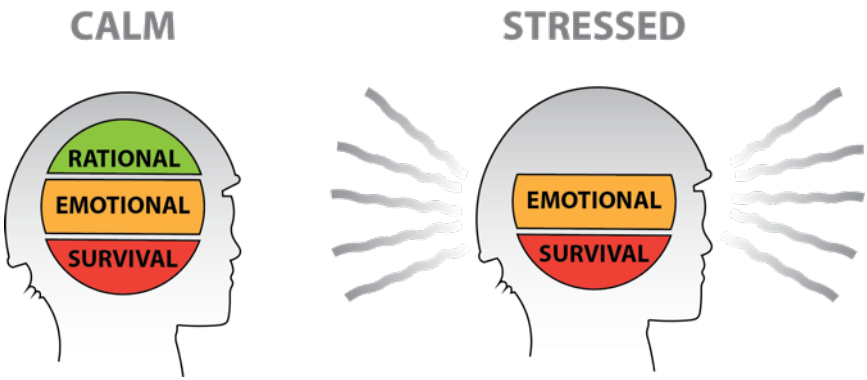
Fatigue and stress

Co-authored by: Jessie Carson, PostGradDip, BaOccThy, OTR, PPT

Stress is often described as a feeling of being tense, worried, wound-up and overloaded.

Low levels of stress can strengthen a worker's motivation and work performance. However, becoming over-stressed can be extremely harmful and unsafe[6].



Where arborists are experiencing any of the following, there will be a strong impact on their ability to make careful, rational decisions:

- Stress from unfamiliarity with their work, or lack of work experience; working out of their comfort zone; working at a height where they are nervous or uncomfortable.
- Physical stress such as fatigue, hunger, heat stress or dehydration; stress related to addiction such as smoking.
- Emotional stress caused by fear, anger, frustration or personal issues.

Stress changes how the mind and body operate. When feeling calm and alert, the part of the brain responsible for making rational decisions is in charge and supports tree workers in making smart and safe choices.

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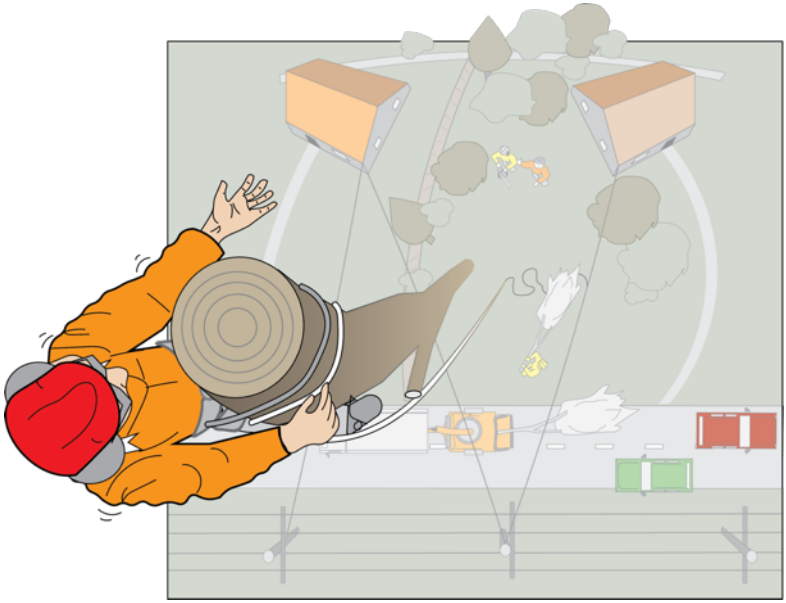
Under stress, the rational part of the brain shuts down and the worker's ability to think sensibly and problem-solve high-risk scenarios is compromised.

In these circumstances, the parts of the brain responsible for making quick, emotionally charged, and often reckless decisions take over, which can put the climber at serious risk of injury or death.



Example:

A tree climber is feeling nervous about the tree he's working in:

- It's a windy day and he feels unsafe
- It's the first time he's climbed a tree this tall and he feels exposed and shaky
- He's worried about the work he has to do: he's not sure of the best way to do it
- He missed his lunch break and feels hungry and fatigued, which compounds his nervousness.

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Even before the climb, his brain starts sending high levels of stress-related hormones (cortisol and adrenaline) throughout his body. These hormones change how the climber breathes, uses his muscles, and how he thinks and feels about the climb.

The more the climber thinks about his nerves, the more nervous his mind and body will become. His ability to plan, organise, problem-solve, and safely complete the job will be compromised, and his body will not work as effectively or efficiently during the climb, putting him further at risk of injury.

In the worst instance, he ceases to see the problem as:

"**How can I dismantle this tree safely and efficiently?**"

Instead, he starts to see the problem as:

"What can I do to stop feeling this high level of stress?"

Climbers can end up making a cut or conducting a rigging operation with a hazardous, uncertain outcome, just to 'get it over with' and stop feeling so stressed.

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Symptoms of stress include:

- Dilated pupils and poor eye contact
- Sweating
- Fidgeting
- Tense muscles
- Inhibited salivation (dry mouth)
- Inhibited digestion (loss of slow-release energy, important for combatting fatigue)
- Stomach pain/cramps
- Quickened breathing
- Fast heart rate
- Loss of ability to make complex plans, or to consider the big picture
- ‘Tunnel-vision’: tendency to focus on whatever is causing the stress
- Reduced ability to communicate effectively
- Poor memory: easy to forget whether knots were tied or chipper fully hooked up
- Feelings of frustration, irritation, and anger at crew mates or work situation.

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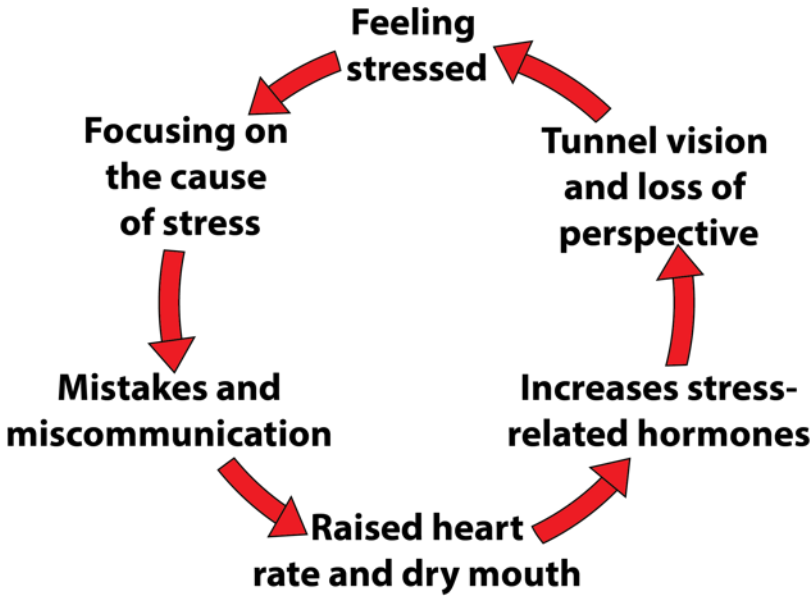
Many of these symptoms are self-reinforcing. For example:

(1) Stress increases heart rate, which facilitates the release of cortisol and adrenaline, further escalating stress in the body and mind.

(2) The inhibition of digestion reduces access to slow-release energy and leads to fatigue and poor concentration.

Workers who take a break normally report that when returning to the job everything is suddenly much easier.

If you're feeling as though the job is getting on top of you…break the cycle!


Feeling stressed
Tunnel vision and loss of perspective
Increases stress-related hormones
Raised heart rate and dry mouth
Mistakes and miscommunication
Focusing on the cause of stress

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Stress management

It is critical that arborists conducting high-risk work have the ability to recognise the symptoms of stress in themselves and in their colleagues.

If you find yourself getting angry, nervous, or if you recognise any of the physical symptoms described above, stop and take a break.

Stress management practices include:

- Taking regular breaks and drinking enough fluid
- Eating healthy meals and getting enough sleep
- Avoiding high-sugar foods such as lollies or energy drinks: these raise blood sugar in short doses, followed by a 'crash'
- Monitoring heart rate and breathing: long slow breaths through the nose can help to reduce levels of stress by inhibiting the release of stress hormones
- Reducing physical stress by selecting energy efficient climbing systems and low-impact work methods
- Developing good communication with crew members so that work flows smoothly, and effort is minimised. Shouting over the top of the chipper noise will instantly raise levels of stress!
- Workers should be fully trained and competent in their roles. Do not push workers into roles beyond their competence levels or give them tasks they don't understand.
- Develop a positive company work ethos and procedures - build and maintain good team relations and 'look out for each other'. Ensure that crew feel they can ask questions and contribute.

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Monitor crew members: if any crew members are becoming ill-tempered, out of breath or seem stressed or emotional:

- Stop work and take a break
- If they do not show signs of improving, either stop work for the day, or rotate work roles to give that crew member an easy task away from high risk activities.

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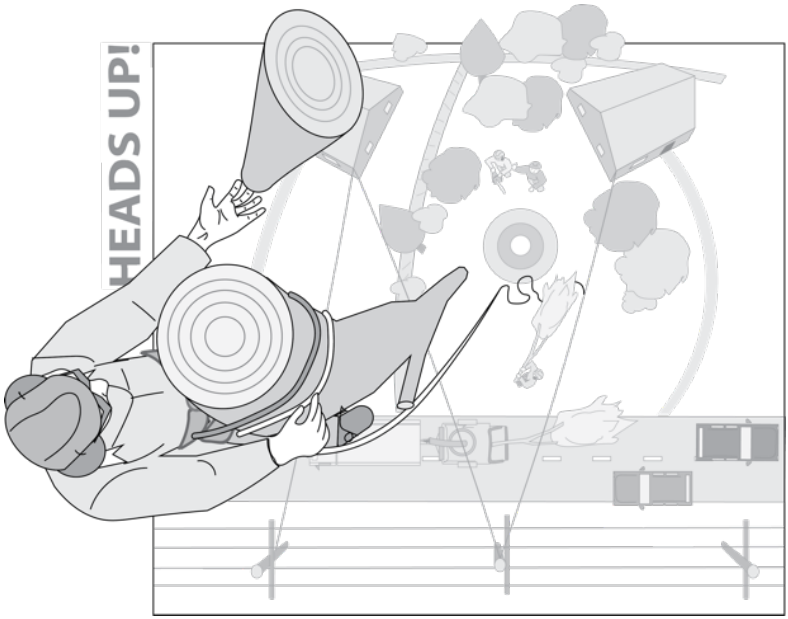
Communication during tree work



Whenever a piece is cut, felled, dropped or thrown from the tree, or whenever there is a chance that anything will fall, it is critical for the aerial worker to ensure that all ground crew are paying attention.

It is easy to fumble logs or drop chainsaws or heavy rigging pulleys. Dropped objects can bounce off stubs, ricochet off the root plate, get tangled in branches or dislodge other material. If ground crew are paying attention, they can normally step comfortably out of the way.

Whenever on site, make sure that you remain constantly aware of what is happening in the trees above you. An accidentally dropped rigging block could be just as fatal as a length of timber.

Use the **call-and-response** protocol each and every time.

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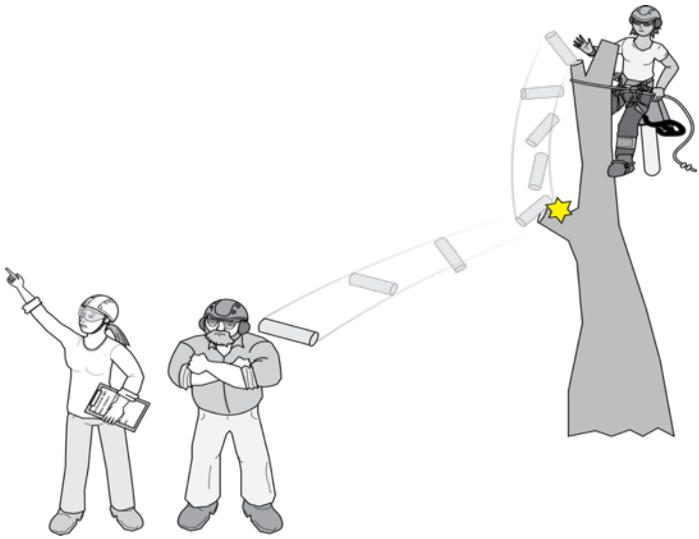
- Dropped branches or heads can spring or ‘spear’ significant distances as they land.
- Flexible, green timber will be more prone to doing this than brittle or dead timber.
- Dropped pieces or rigging equipment can travel a long way if they bounce off stubs or branches after falling.
- Always pay attention when on site, even when the aerial worker is cutting or dropping small stubs or when rigging – a small stub dropped from high enough will kill, and dead branches can break off at any time.
- Maintain good **call-and-response** communication throughout dismantling operations.



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Call-and-response protocol

Good, clear communication is vital on tree sites. During tree dismantling, poor communication or misunderstandings can have severe consequences. Machines are often running, workers become focused on their own roles, and it is easy for mistakes to be made.

Always ensure that good communication is possible: remember the call and response protocol:

1	**Aerial worker:**	Heads up?
2	**Ground crew:**	All clear!

If the response is not heard, **DO NOT PROCEED** with the planned work.

If communication is difficult or impossible, or if misunderstandings keep occurring, stop work until clear methods of communication are re-established. Consider the use of one of the methods of communication below.

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Methods of communication on tree sites

Method	Advantages	Disadvantages
Voice communication (direct)	Can be clear and precise and provide additional details that can be difficult to communicate using hand or whistle signals Simple, does not require additional equipment Reduces confusion due to misunderstood signals, works with novice crew members Does not need visibility.	Very short range: beyond 15–20 m can be tiring to communicate. Easily inhibited by other work activities, wind noise, machinery in operation etc. Cannot always be used to 'interrupt' someone who has earmuffs on, is using a chainsaw etc.

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Method	Advantages	Disadvantages
Hand signals	Can be used to communicate over long distances Are not interrupted by machine noise or work operations Are simple, do not require additional equipment.	Can be hard to be precise/give details etc. Requires all crew to know and learn the same signals. Requires line-of-sight and eye-contact; easily blocked by tree parts, structures or inattention. Cannot be used to 'interrupt' someone who is not paying attention. Does not draw the attention of someone who is distracted. Communications are not 'broadcast' – any third-party entering site will not hear.

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Method	Advantages	Disadvantages
Whistle signals	Can be used to communicate over long distances. Travel further than direct voice communication. Are simple, do not require much additional equipment. Can normally be used to 'interrupt' someone who is not paying attention. Draws attention of all crew members on a busy site, even if otherwise distracted.	Can be hard to be precise/give details etc. Requires all crew to know and learn the same signals. Can be interrupted by very loud machine noise etc. (such as crew working near chipper).

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Method	Advantages	Disadvantages
Voice communication (indirect): **UHF (voice-activated or push-to-talk communications)**	Allows precise communication and detail even with novice crew members (such as 'I'm going to cradle rig this one so you'll only get half the load'). Is not tiring to communicate. Can be used to communicate over very long distances with multiple crew members on dispersed sites. Easy to add multiple additional parties to the communications network, providing they have UHF communications devices. Is not interrupted by obstacles/noise Can normally be used to 'interrupt' someone who is not paying attention, particularly if UHF speakers are incorporated in earmuffs.	Requires all workers to have UHF equipment or to implement a secondary communications protocol within separated work parties. Breaks down if any devices fail May require push-to-talk, which may interfere with work operations Call-and-response must be followed carefully: can be easy **not** to notice when someone has dropped out of the loop. Communications are not 'broadcast': any third-party entering site will not hear. UHF equipment can be comparatively bulky and awkward to carry whilst climbing.

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Method	Advantages	Disadvantages
Voice communication (indirect): **Bluetooth communications**	Allows precise communication and detail even with novice crew members. Is not tiring to communicate Can be used to communicate over reasonably long distances (approximately 100 m with current technology) with up to 5 crew members on dispersed sites Is not interrupted by obstacles/noise Can be used to 'interrupt' someone who is not paying attention.	Requires all workers to have Bluetooth equipment or to implement a secondary communications protocol within separated work parties. Retrofitting Bluetooth equipment may compromise PPE. Breaks down if any devices fail Call-and-response must be followed carefully – can be very easy **not** to notice when someone has dropped out of the loop. Problematic if any worker does not have communications equipment or if too many workers are on site for the Bluetooth 'loop': easy to forget to include unlinked worker in communications. Communications are not 'broadcast': any third-party entering site will not hear.

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Hand and whistle signals for use on tree sites

The following page provides hand and whistle signals for use when working on tree work sites.

The signals have been ratified by Arboriculture Australia Ltd and the New Zealand Arboricultural Association and are suggested for use as standard signals on all tree work sites in Australia and New Zealand.

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HAND & WHISTLE SIGNALS
FOR USE IN TREE WORK

heads up!
or
all clear!

ground-crew to ground-crew

hand raised to warn climber not to cut

stop

1 short ●

STOP

1 short

DANGER

All clear to cut

(ground crew signal to climber)

2 long ▬▬

make chopping motion with hand

pull harder on tag line

or

send up rigging or tag line

make gesture with both hands as if pulling rope

heads up!
or
all clear!

2 long ▬▬

Fell (or drop) piece or section in this direction

(ground crew signal to climber)

hold rigging line taut

or

don't let it run

swing arm horizontally

send up chainsaw

or bigger chainsaw required

join fists then simulate pulling starter cord of chainsaw

put this many wraps on the portwrap or bollard

hold up no. of fingers to show no. of wraps

lift up
or
add tension to line

2 short ●●

lower down
or
let it run

1 long ▬

turn off machine / stop doing that

simulate cutting throat with hand

hold taut then lower

swing arm horizontally then vertically

look at me
or
look at that

point at eyes then at object to attend to

CREEP SPEED: USE HAND SIGNAL FOR MOTION WITH HAND CLENCHING AND UNCLENCHING

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Site management during tree work

Try to maintain a clear, uncluttered workspace. Broken branches, debris, piles of timber and dropped equipment will result in trips and falls, lost and broken gear and extensive loss of time. Compare the following two tree work sites.

Where possible, use breaks in work to conduct ‘housekeeping’: clear pathways, flake rope out of the way, prepare the next set of tools required and generally tidy up.

Rushed worksites (where everything is in a tangled mess, tools are discarded all over the site and debris is piling up) inevitably run slower than well-managed sites. In addition, lost or damaged equipment, frustration and accidents will occur more frequently.

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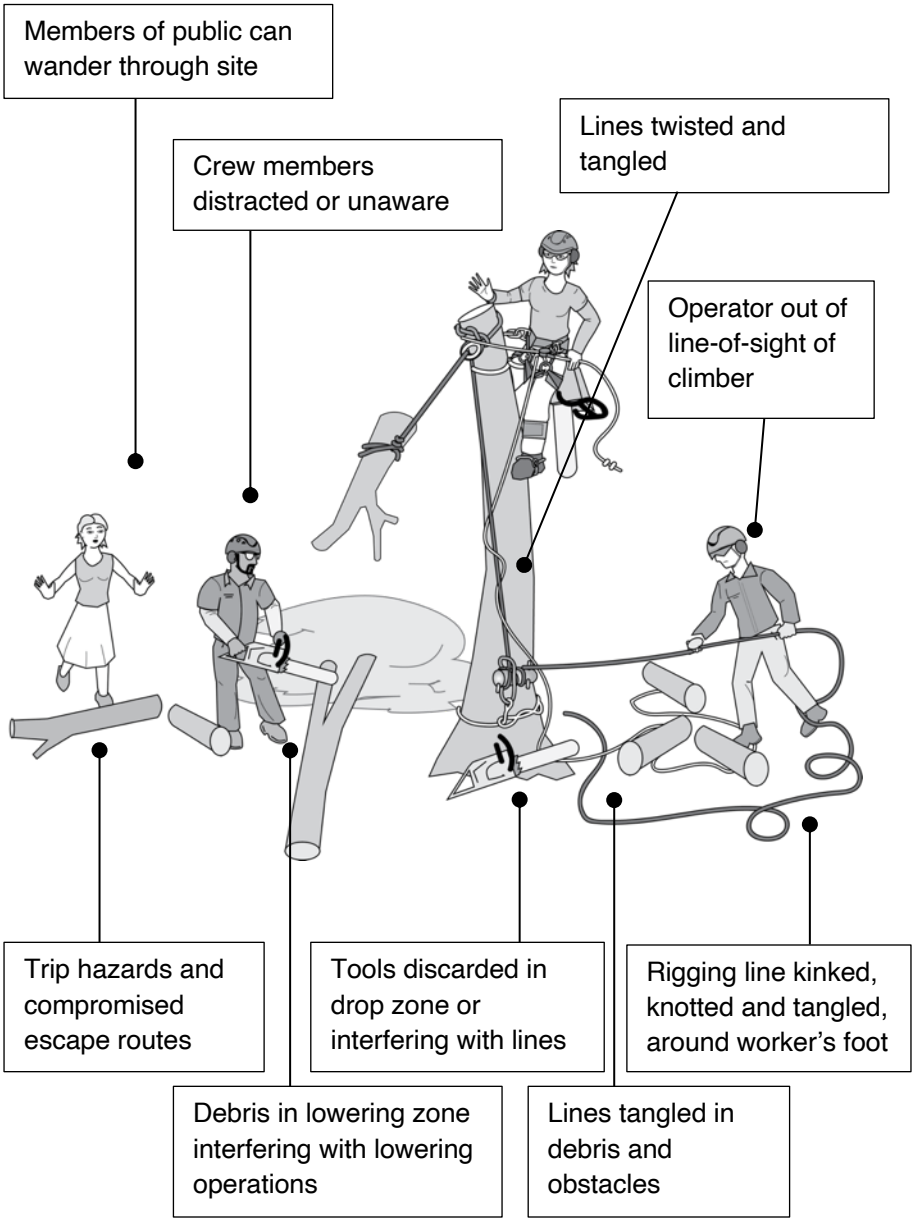
Bad site management


Members of public can wander through site
Crew members distracted or unaware
Lines twisted and tangled
Operator out of line-of-sight of climber
Trip hazards and compromised escape routes
Tools discarded in drop zone or interfering with lines
Rigging line kinked, knotted and tangled, around worker's foot
Debris in lowering zone interfering with lowering operations
Lines tangled in debris and obstacles

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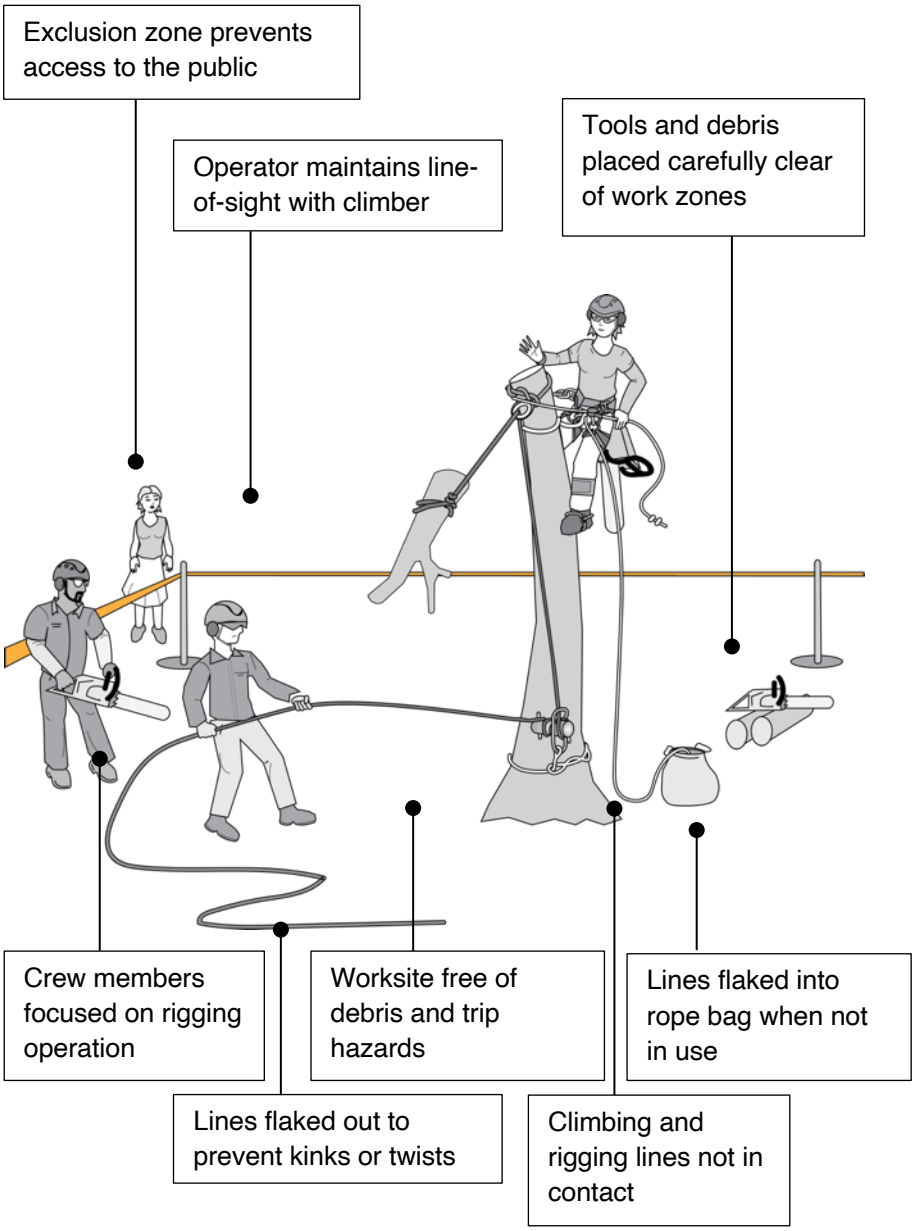
Good site management


Exclusion zone prevents access to the public
Operator maintains line-of-sight with climber
Tools and debris placed carefully clear of work zones
Crew members focused on rigging operation
Worksite free of debris and trip hazards
Lines flaked into rope bag when not in use
Lines flaked out to prevent kinks or twists
Climbing and rigging lines not in contact

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5: Completing tree works

Processing debris

Where possible, debris should be processed according to the requirements of the scope of work while the tree work is being conducted. This avoids the build-up of debris and allows workers access for other work operations, particularly in confined work sites.

On some sites where tree parts are unstable, where debris is being left or where debris will be processed using machines, it may be preferable to complete tree trimming or removal work, and process the debris later.

When processing debris:

- Follow correct manual handling techniques:
    - Cut pieces to manageable sizes
    - Seek assistance moving larger pieces
    - Use slings or tools to lift where possible
    - Use machines to lift wherever possible.
- Remember that both timber and wood mulch are valuable resources – needless waste occurs on Australian tree work sites due to the unconsidered disposal of timber and wood mulch:
    - Assess whether timber can be retrieved for milling
    - Assess whether leaving debris could provide ground habitat
    - Assess whether firewood can be sold
    - Assess whether wood mulch can be used on the site where it was generated
    - Assess whether wood mulch can be sold locally.

Always ensure that suitable biosecurity protocols are followed: see **MIS308 Tree Pruning** and **MIS312 Environmental Arboriculture** for more details.

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Cleaning, storing and transporting equipment

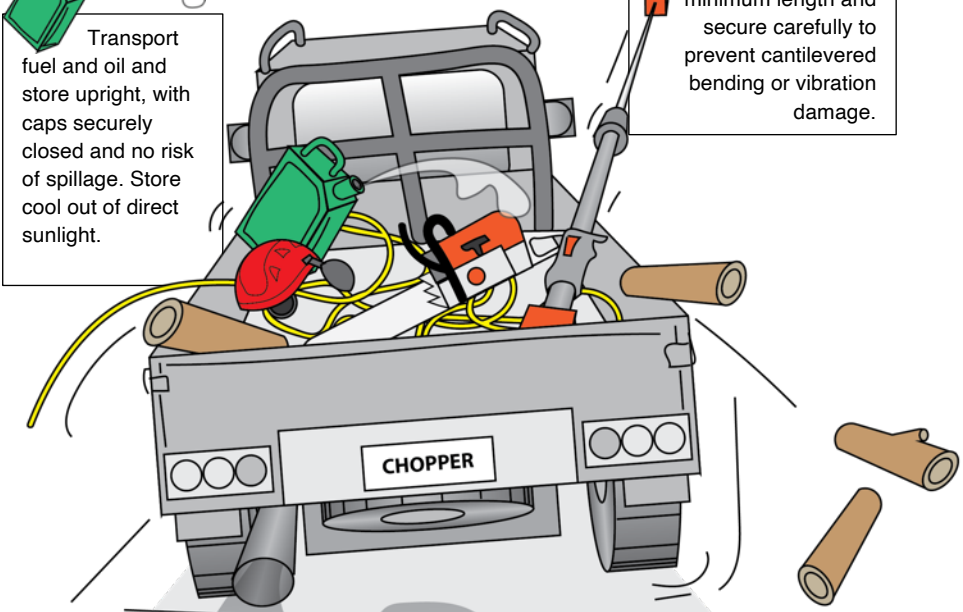
Once the scope of work has been checked and the work is complete, check the site to make sure all equipment has been retrieved. Take the time to clean equipment if necessary, and to store and transport all equipment correctly.

Clean, coil or flake ropes and climbing equipment into rope bags. Avoid transporting dirty ropes if possible: particles will abrade fibres. Avoid contact with sharp edges or abrasives while transporting. Fuel vapour may damage ropes.

PPE should be cleaned and dried if necessary and stored carefully in a dry location out of sunlight. Take care PPE will not be abraded, damaged, or come into contact with fuel or oil during transport.

Transport fuel and oil and store upright, with caps securely closed and no risk of spillage. Store cool out of direct sunlight.

Retract pole saws to minimum length and secure carefully to prevent cantilevered bending or vibration damage.



Clean chainsaws – particularly if used on palms or similar. Transport upright with scabbards on so they will not be damaged or tipped.

Carefully secure timber and debris to prevent damage to equipment and to avoid falling debris while driving.

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Retiring condemned equipment

Equipment that has been damaged or compromised during tree work operations should be condemned. Examples of equipment damage that could result in the equipment being condemned include:

- Rigging equipment that has received a large, unplanned shock load, significantly exceeding the recommended safe working load limit.
- PPE or life-support equipment that has been impacted by a dropped object or exposed to fuel or chemical spills.
- Ropes with nicks, cuts, burns, sloughing, stretching or significant glazing or abrasion.

DO NOT rely on the next pre-start equipment inspection to identify these issues. If you know that the equipment has been compromised, it is important to deal with it immediately to prevent accidental re-use.

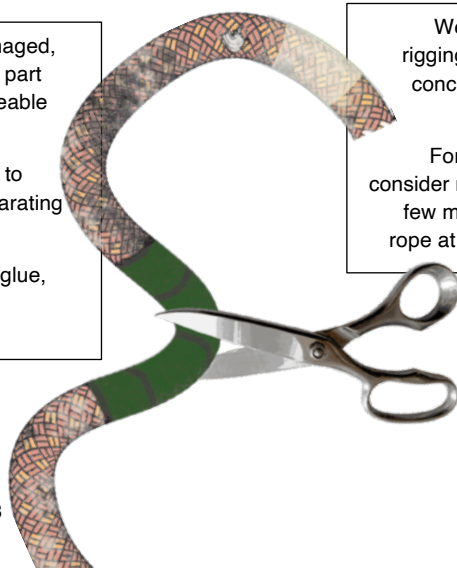
- Cut or destroy the equipment.
- Dispose of the equipment.
- Record that the equipment was condemned and disposed.

It is important to follow these steps to ensure that damaged equipment does not accidentally re-enter service. Follow the correct protocol for your organisation, ensure that the person responsible for replacing equipment has been notified and a replacement can be obtained.

If only part of a rope is damaged, try to remove the damaged part while retaining as much useable rope as possible.

Wrap tape around the rope to prevent the fibres from separating before cutting.

Seal the exposed end with glue, whipping or by using heat (depending on rope type).



Wear and fatigue in rigging ropes is usually concentrated near the working ends

For un-spliced rope, consider removing the first few metres of a rigging rope at regular intervals.

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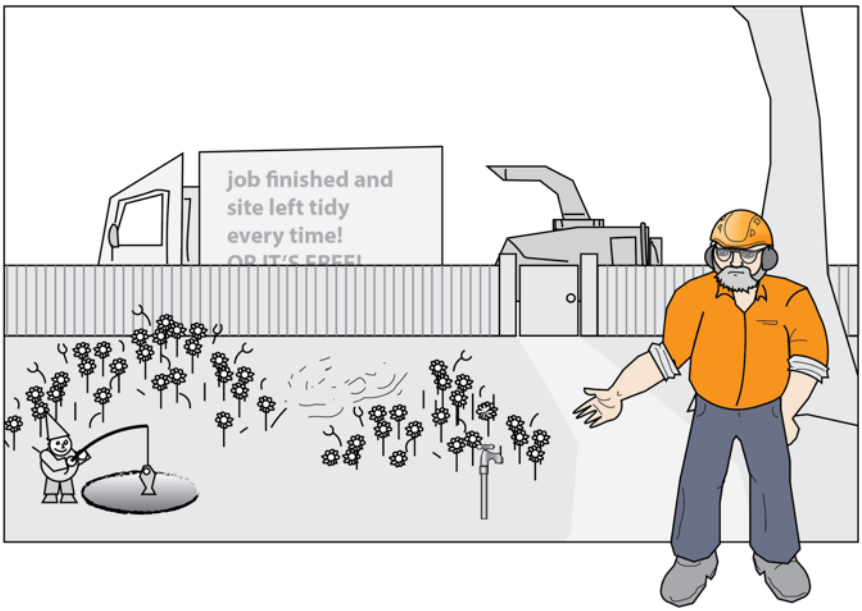
Completion of works

Before leaving the site, if possible, confirm with the client that they are happy with the completed works, that the scope of works has been completed and that no damage needs to be repaired. If anything has been broken, let the client know as soon as possible, even if you are able to repair the damage. Honesty is always the best policy.

It is much better to have this conversation before leaving the site if possible. Once you have driven away, something as simple as a garden bench you forgot to return to its original position may turn into a long drive back, or an irritated client who may delay payment or give negative reviews.

Try to leave every job site just the way you found it: with all works completed as required and a happy client!



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Glossary

Act	Acts are legal documents developed to ensure the health and safety of workers and workplaces
ANSI	United States standard. See **Australian / New Zealand and International Standards.**
Arboriculture	The practice and study of the care of trees and other woody plants in the landscape
Arborist	A professional worker who through formal training and experience is competent to perform arboricultural works.
Arc flash	Arc flash occurs where an electrical current flows through an air gap between two conductors or between a conductor and the ground. It can cause a heat and shock wave.
AS/NZS	Australian / New Zealand standard. EG: AS/NZS 1336-2014 Recommended practices for occupational eye protection. See **Australian and International Standards.**
Australian/New Zealand and International Standards	Standards are voluntary documents that set out specifications, procedures and guidelines that aim to ensure products, services, and systems are safe, consistent, and reliable.
Authorised Person	A worker who through assessment of competency has been approved by a network operator to work in closer proximity to electrical conductors when meeting specific conditions. Contrast with **Ordinary Person**.
Code of Practice (CoP)	An approved Code of Practice is a legally admissible document which helps businesses interpret their duties under the WHS act
Competency	Competency is the consistent ability to perform particular tasks and duties to the standard of performance expected in the workplace. For many arboricultural tasks, regulations and guidance materials require workers to hold appropriate units of competency for their work tasks, or be supervised by someone who holds the applicable units.
Control measures	Control measures are processes, equipment or work alterations that eliminate or mitigate the risk of harm.
EN	European standard. See **Australian/New Zealand and International Standards.**
EWP	Elevated Work Platform.

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Exclusion zone	An area around a work site which members of the public are prevented from entering.
GPS	Global Positioning System – an electronic locating device used when outside phone signal in remote areas.
Hazard	A hazard is a situation or thing that has the potential to harm a person or cause damage. Hazards at work may include noisy machinery, a moving forklift, chemicals, electricity, working at heights, a repetitive job, bullying and violence at the workplace.
Hierarchy of risk control measures	The hierarchy of risk control measures is a tool used when determining how risks are to be managed, or when selecting between risk control measures.
High Visibility clothing (High Vis or High Viz)	Clothing that is made in specific bright reflective colours. Class D is for daytime use only; Class N has reflective strips and is for day, dusk and night use.
JSA	A Job Safety Analysis is a standard form, which is filled out during a site-specific risk assessment. (See also JSEA)
JSEA	A Job Safety and Environment Analysis is a standard form, which is filled out during a site-specific risk assessment. (See also JSA)
MEWP	Mobile Elevated Work Platform.
OHS	Occupational Health and Safety is another term used for Work Health and Safety (see WHS).
Ordinary Person	When working in the vicinity of electrical conductors, an Ordinary Person will have to observe greater **Safe Approach Distances** (SAD). Contrast with **Authorised Person**.
PCBU	A Person Conducting a Business or Undertaking is someone who has legal responsibilities for duty of care under the WHS Act.
PLB	Personal Locator Beacon – an emergency signalling and location device.
PPE	Personal Protective Equipment includes clothing or other articles like helmets that may help to protect the wearer in the event of an accident.
Risk assessment	Risk assessment is the process of deciding how dangerous or potentially severe a hazard is12: it combines magnitude of hazard, probability of occurrence and the likelihood of damage to result from such incident.

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Risk control	Risk controls describe taking actions to eliminate health and safety risks so far as is reasonably practicable, and if that is not possible, minimising them so far as is reasonably practicable. Eliminating a hazard will also eliminate any risks associated with that hazard.
Risk control measures	Control measures are processes, equipment or work alterations that eliminate or mitigate the risk of harm.
Risk matrix	A risk categorisation tool intended to enable businesses and workers to evaluate levels of risk and assign suitable control measures.
Risk rating	A single value comprising the likelihood of an event occurring and the severity of the consequences.
Risks	Risk is the likelihood that harm (death, injury, illness or damage) might occur when exposed to a hazard.
SAD	**Safe Approach Distances** describe the closest acceptable approach distances for tree workers and plant operating in the vicinity of electrical conductors.
Scope of works	A document describing the work that must be conducted, as well as other details including processing of debris, timelines for works to be conducted, and other applicable information.
SOPs	Standard Operating Procedures are procedures written by businesses to help ensure that work tasks are undertaken in a safe and repeatable manner.
SWMS	A Safe Work Method Statement is a document that sets out the high-risk construction work activities to be carried out at a workplace, the hazards arising from these activities and the measures to be put in place to control the risks. Businesses are required to have a SWMS for every high-risk construction work activity that they undertake.
Traffic control / traffic management	A combination of signs, workers, cones or other processes implemented as part of an approved traffic management plan to allow safe work in the vicinity of a public road.
UHF	Ultra-High Frequency device; a direct broadcast communication device.
WHS	Work Health and Safety is the general descriptor for processes, regulations, equipment and policies concerned with preventing injury in the workplace.

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7 WorkSafe NZ (2012), *Safety and Health in Arboriculture Approved Code of Practice*

Note: Australian and New Zealand regulations, codes of practice, guidance material and Australian/New Zealand and international standards are referred to within the text of this document. In each case the code and title is provided when the reference is made within the body of the text.

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Minimum Industry Standards

This document is one in a series of Minimum Industry Standards ("**MIS**") produced by Arboriculture Australia Ltd in partnership with the New Zealand Arboricultural Association and the wider arboriculture community to ensure that all people working, assessing and providing advice in relation to trees (excluding commercial forestry) have access to industry peer-reviewed documents explaining the core standards of skills and equipment with which competent practitioners should be familiar.

Where a MIS exists for a particular task, it is deemed by industry experts to:

- Provide an overview of the task, as it is practiced in industry.
- Define an industry consensus regarding the current appropriate applied-practice ways of conducting that task.
- Specify the minimum skill and knowledge requirements for performing particular tasks in the workplace.

At times, the complexity of a task may surpass the level of skill described in a MIS. It is the practitioner's responsibility to clearly understand and interpret the level of skill described in the MIS and whether that level is adequate for the task before them. In many cases a person will need to refer to several MIS documents to complete one task.

The prime purpose of the MIS is to provide minimum standards for the safety of tree workers, while still encouraging and fostering innovative practices.

Equipment, tests, inspection or practices other than those in this document may be perfectly satisfactory. Organisations are at liberty to provide different equipment, to specify different tests, or to inspect equipment in a manner or at intervals assessed as appropriate to particular circumstances, provided that these alternatives are based on sound design or reasoning and that the outcome of worker safety is not prejudiced.

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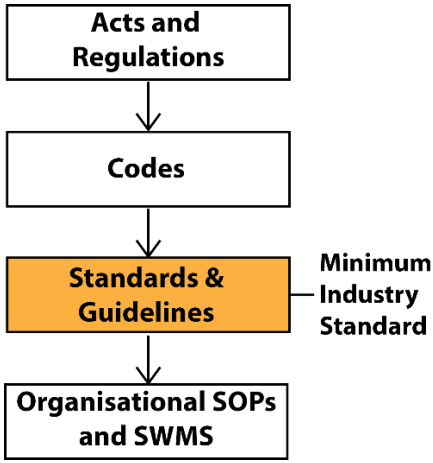
Both Arboriculture Australia Ltd and the New Zealand Arboricultural Association encourage any worker in any industry to conduct annual continued education and training to grow their competency in specific tasks and ensure they have appropriate training in the task being conducted prior to commencing any work.

The following diagram outlines the framework into which this MIS fits:



This MIS does not substitute for, or override, any legislation or regulation enacted by jurisdictional regulators or safety rules implemented by organisations. As depicted above, it is merely a guiding tool within the system.

Arboriculture Australia Ltd and the New Zealand Arboricultural Association will monitor the use and impact of these MIS and, consequently, may review and amend as the industry continues to evolve.

It is not the responsibility of Arboriculture Australia Ltd or of the New Zealand Arboricultural Association to notify users of these documents when reviews and reprints occur.

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Using the MIS in training and assessment

This document provides information that can be used to assist students/learners in gaining knowledge and understanding industry terminology and norms. Learning and practising skill components must be conducted under the supervision of a competent person or trainer. Do not attempt to practice any of the techniques described in this document without the supervision of a competent practitioner.

In Australia

A key outcome for the production of national MIS documents is their use to support training aligned to the units of competency from the Australian AHC Agriculture, Horticulture, Conservation and Land Management Training Package, in particular the arboricultural industry sector-specific units of competency.

The MIS for each work task defines an industry consensus of the benchmark of competence in a work task. Therefore, it is an assessment requirement for each unit of competency that the performance criteria, performance evidence and knowledge evidence demonstrated by the candidate is **at least** to the level described in the MIS for that work task.

Where units of competency are not specific in their description of the industry techniques or benchmark of ability expected of holders of that unit, RTOs should use the relevant MIS document as a supplementary guide for industry expectations when conducting training or designing assessment instruments.

This does not mean that techniques or equipment not described in the relevant MIS should not be taught or assessed. There are many ways to appropriately complete each task and some methods and equipment may be more advanced than those in this document.

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In New Zealand

A key outcome for the production of national MIS documents is their use to support training and education towards the New Zealand Certificates in Horticulture Services (Arboriculture) and Arboriculture. These Certificates (Levels 3 to 5) are designed to provide the arboriculture industry with individuals who have the technical skills and knowledge to safely undertake and manage arboriculture operations to maximise effectiveness.

The MIS for each work task defines an industry consensus of the benchmark of competence in a work task. The level at which the work task is assessed will reflect the New Zealand Qualification Authority (NZQA) Level, the Strategic Purpose of the qualification and the corresponding Educational and Employment Pathway. Depending on the relevant Graduate Profile, work tasks described in the MIS may address the content of more than one qualification and may progress more than one Education Pathway.

This does not mean that techniques or equipment not described in the relevant MIS should not be taught or assessed. There are many ways to appropriately complete each task and some methods and equipment may be more advanced than those in this document.

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Disclaimer for Minimum Industry Standards and all associated documents

This document refers to various standards, guidelines, calculations, legal requirements, technical details and other information. It is important that readers and parties who implement this MIS are aware of the duties and recommendations contained in these other sources.

Over time, changes in Australian and New Zealand Standards, industry standards and legislative requirements, as well as technological advances and other factors relevant to the information contained herein may affect the accuracy of the information contained in this document. Accordingly, caution should be exercised in relation to the use of the information in this document.

Arboriculture Australia Ltd and the New Zealand Arboricultural Association will regularly update the MISs as deemed necessary. It is the responsibility of the user to ensure the version they are using is current. It is not the responsibility of Arboriculture Australia Ltd or of the New Zealand Arboricultural Association to notify users of these documents when reviews and reprints occur. Please go to the Arboriculture Australia Ltd website at *trees.org.au* or to the New Zealand Arboricultural Association website at *nzarb.org.nz* to confirm that you are using the current version.

The information in this document has been reviewed and validated by state and national industry representatives and deemed to be an accurate description of appropriate applied-practice skills and techniques. Arboriculture Australia Ltd and the New Zealand Arboricultural Association accept no responsibility or liability for the accuracy of any information contained herein, or the consequences of any person relying on such information. All arboriculture work is undertaken at your own risk.

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Industry stewardship program

The development of the Minimum Industry Standards has been made possible by generous support from the following businesses who provided financial seed funding to the project to improve and increase education and safety in the arboriculture and vegetation management industries.

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This book is one in a series of Minimum Industry Standards developed by Arboriculture Australia Ltd. and the New Zealand Arboricultural Association in partnership with the national arboriculture and vegetation management communities in both countries. These industry peer-reviewed standards explain the skills and equipment with which competent practitioners should be familiar.

MIS300 SAFE TREE WORK covers the core work skills of operating safely on arboricultural sites.

The document is aimed at workers conducting tree pruning, tree removal, and other practical tree work operations, rather than consultancy, testing or other types of arboricultural works.

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